

## APPENDIX J

### Appendix E. R6 Stream Survey and PIBO Effectiveness Monitoring Data for the Murderers Creek Allotment

**Table 1. Summary of Available R6 Stream Survey Data vs. Fish Habitat Standards for Streams within Allotments.  
Bark Cabin, Tennessee, and Oregon Mine Creeks**

PIBO Data <sup>1</sup> ( <b>Bold</b> ) <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data			PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
						Properly Functioning	At Risk	Not Properly Functioning
Stream Name	<b>Bark Cabin Creek Reach 1</b>	<b>Tennessee Creek Reach 1</b>	<b>Oregon Mine Creek Reach 1</b>	-	-	-	-	-
Pasture Name	Blue Ridge	Oregon Mine	Oregon Mine	-	-	-	-	-
Survey Date	1992 (June 27- June 29)	1995 (Aug 27- Sept 9)	1995 (Aug 22)	-	-	-	-	-
<b>Sample Type</b>	-	Riparian Only	Riparian Only	-	-	-	-	-
6 <sup>th</sup> Field HUC	170702010402	170702010301	170702010301	-	-	-	-	-
<b><i>Av Bankfull (B) and/or Wetted (W) Width (feet)</i></b>	B 3.0 W 2.4	W 3	-	-	-	-	-	-
<b><i>Av Gradient (%)</i></b>	4.0	5.3	6.6	-	-	-	-	-
<b>Residual Pool Depth (feet)</b>	0.3	-	-	-	-	-	-	-
<b><i>Pool Frequency (#/mi)</i></b>	37.08	-	-	96 <sup>2</sup> 56 <sup>3</sup> 47 <sup>4</sup> 26 <sup>5</sup>	75-132 <sup>2</sup> 38-66 <sup>3</sup> 30-53 <sup>4</sup> 15-26 <sup>5</sup>	Meets pool freq & LWD recruitment standards channel width    # pools/mile 5 feet            184 10 "              96 15 "              70 20 "              56 25 "              47 50 "              26	Meets pool freq standards but not LWD recruitment	Does not meet pool freq standards

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	<b>R6 Level II Stream Survey Data</b>			<b>PAC FISH RMO</b>	<b>Amend 29 DFC</b>	<b>NMFS Matrix of Pathways and Indicators Ranges of Criteria</b>		
						<b>Properly Functioning</b>	<b>At Risk</b>	<b>Not Properly Functioning</b>
<i>Pool Quality</i>	No >1m deep pools, max spot temp 55.4F	Max spot temp 49.0F	Max spot temp 50.0F	-	-	Pools >1m (3.28ft) deep, good cover, cool water, minimal filling	Few >1m pools or inadequate cover/temp, moderate filling	No >1m pools & inadequate cover/temp, major filling with sediment
<b>Percent Pools</b>	15.6	-	-	-	-	-	-	-
<b>Bankfull (B) or Wetted (W) W/D Ratio</b>	B 5.0	B 11.7	B 12.6	<10 <sup>6</sup>	<10 <sup>6</sup>	<10 <sup>7</sup>	10-12 <sup>7</sup>	>12 <sup>7</sup>
<b>D50 (mm), or Dominant Substrate &amp; Embeddedness</b>	Sand, Embeddedness >35%	Gravel, Embeddedness <20%	Embeddedness <20%	-	Embedded <=20%	Dominant substrate gravel (2-64 mm) or cobble (64-256 mm) (interstitial spaces clear), or embeddedness <20%	Gravel or cobble subdominant, or embeddedness 20-30% if dominant	Bedrock, sand, silt, or small gravel dominant, or embeddedness >30% if gravel or cobble dominant
<b>Pct Fines &lt;2 mm in Riffles (R) or Pool Tails (P)</b>	R 4.0	-	-	-	-	<12% fines <sup>8</sup> in gravel	12-20% fines <sup>8</sup> in gravel	>20% fines <sup>8</sup> in gravel
<b>Percent Stable Banks (CS &amp; FB)</b>	92.8	80-90	65-79	>80	>90	>90% stable	80-90% stable	< 80% stable
<b>Percent Stable Banks (CS, FB, US)</b>	-	-	-	-	-	-	-	-
<b>Percent Undercut Banks</b>	-	-	-	>75	50-75% undercut <sup>9</sup>	-	-	-

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data			PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
						Properly Functioning	At Risk	Not Properly Functioning
<b><i>Large Wood Frequency (#/mi)<sup>14</sup></i></b>	23.4 <sup>10</sup> Potential recruitment is poor	-	-	>20 <sup>13</sup>	20-70 <sup>10</sup> 80-120 <sup>11</sup> 100-350 <sup>12</sup>	>20 <sup>13</sup> and adequate sources for recruitment	>20 but lacks recruitment to maintain	<20 and lacks recruitment
<i>Percent Shade/Canopy Closure</i>	64.4	64.0	55.7	-	40-55 <sup>15</sup> 50-65 <sup>16</sup> 60-75 <sup>17</sup> 80 <sup>18</sup>	-	-	-
<b>Greenline Wetland Rating</b>	-	-	-	-	-	-	-	-
<b>Greenline Woody Cover</b>	-	-	-	-	-	-	-	-
<i>Physical Man-made Barriers<sup>19</sup></i>	none	None	Two barrier culverts	-	-	Any in watershed allow passage @ all flows	Any don't allow passage @ base flows	Any don't allow passage @ range of flows
<i>Off-channel Habitat &amp; Refugia</i>	0.3 percent side channels on reach	-	-	-	-	Low energy backwaters & side channels	Some backwaters & high energy side channels	Few or no backwaters

Notes: **1)** All PIBO data units converted from metric to English except for mm measurements; **2)** Channels of <10 feet in width; **3)** Channels of >10 to 20 feet in width; **4)** Channels of >20 to 25 feet in width; **5)** Channels of >25 to 50 feet in width; **6)** Criteria is for wetted W/D ratio; **7)** Criteria is for bankfull W/D ratio; **8)** Fines defined as <0.85mm in gravel; **9)** In non-forested systems with 2% or less gradient; **10)** In Ponderosa pine ecosystems (at least 12 inches in diameter and 20% > 20 inches in diameter; and at least 35 feet long or 1.5 times bankfull width); **11)** In mixed conifer ecosystems (at least 12 inches in diameter and 20% > 20 inches in diameter; and at least 35 feet long or 1.5 times bankfull width); **12)** In Lodgepole pine ecosystems (at least 6 inches in diameter and 10% > 12 inches in diameter; and at least 18 feet long or 1.5 times bankfull width); **13)** LWD defined as >12 inch diameter and > 35 ft length; **14)** Stream surveys conducted in 1995 and earlier **a)** included not only LW material within the bankfull channel, but also leaning trees that have the potential to fall into the stream, and **b)** included a "Brush" LWD category that is not considered functional LWD as per Amendment 29 DFCs and the MPI unless in Lodgepole Pine ecosystems. Stream surveys conducted in 1996 and later **a)** only included trees actually within the bankfull channel interacting with stream flow during bankfull conditions, and

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**b)** included a “Small” LWD category that is not considered functional LWD as described above; **15)** In Ponderosa pine ecosystems; **16)** In mixed conifer ecosystems; **17)** In Lodgepole pine ecosystems; **18)** In hardwood/meadow complexes; **19)** Culvert barrier data from MNF Culvert Assessment GIS layer.

**Table 2. Summary of Available R6 Stream Survey Data vs. Fish Habitat Standards for Streams within Allotments.  
Buck, Vester, Blue, and Corral Creeks**

PIBO Data <sup>1</sup> (Bold) <i>R6 Survey Protocol</i> <i>(Italics)</i> <i>Both (Bold &amp; Italics)</i>	R6 Level II Stream Survey Data				PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
							Properly Functioning	At Risk	Not Properly Functioning
Stream Name	Buck Creek Reach 1	Vester Creek Reaches 1-2	Blue Creek Reach 1	Corral Creek Reaches 1-4	-	-	-	-	-
Pasture Name	Frenchy Butte	Frenchy Butte	Frenchy Butte, Blue Ridge	Deer Creek	-	-	-	-	-
Survey Date	1995 (July 31)	1995 (Aug 14-30)	1995 (Sept 7)	1993 (Aug 30-Sept 8)	-	-	-	-	-
Sample Type	-	-	Riparian Only	-	-	-	-	-	-
6 <sup>th</sup> Field HUC	1707020102 06	170702010 206	170702010 205	17070201 0206	-	-	-	-	-
<b><i>Av Bankfull (B) and/or Wetted (W) Width (feet)</i></b>	B 4.6 W 4.1	B 4.1 W 3.9	W 2.1	B 6.1 W 5.1	-	-	-	-	-
<b><i>Av Gradient (%)</i></b>	4.2	4.3	3.0	5.5	-	-	-	-	-
<b><i>Residual Pool Depth (feet)</i></b>	0.8	0.9	-	1.0	-	-	-	-	-
<b><i>Pool Frequency</i></b>	43.8	26.5	-	82.6	96 <sup>2</sup> 56 <sup>3</sup>	75-132 <sup>2</sup> 38-66 <sup>3</sup>	Meets pool freq & LWD recruitment standards	Meets pool freq standards but	Does not meet pool freq standards

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data				PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
							Properly Functioning	At Risk	Not Properly Functioning
<b>(#/mi)</b>					47 <sup>4</sup> 26 <sup>5</sup>	30-53 <sup>4</sup> 15-26 <sup>5</sup>	channel width    # pools/mile 5 feet            184 10 "               96 15 "               70 20 "               56 25 "               47 50 "               26	not LWD recruitment	
<i>Pool Quality</i>	Max spot temp 52.0F	Max spot temp 63.0F	Max spot temp 57.0F	0 >1m deep pools, Max spot temp 57.0F	-	-	Pools >1m (3.28ft) deep, good cover, cool water, minimal filling	Few >1m pools or inadequate cover/temp, moderate filling	No >1m pools & inadequate cover/temp, major filling with sediment
<b>Percent Pools</b>	35.9	15.4	-	27.3	-	-	-	-	-
<b>Bankfull (B) or Wetted (W) W/D Ratio</b>	B 10.3	B 8.7	B 12.1	B 7.0	<10 <sup>6</sup>	<10 <sup>6</sup>	<10 <sup>7</sup>	10-12 <sup>7</sup>	>12 <sup>7</sup>
<b>D50 (mm), or Dominant Substrate &amp; Embeddedness</b>	Gravel, Embeddedness <20%	Sand, Embeddedness >20%	Embeddedness <20%	Gravel, Embeddedness <30%	-	Embedded <=20%	Dominant substrate gravel (2-64 mm) or cobble (64-256 mm) (interstitial spaces clear), or embeddedness <20%	Gravel or cobble subdominant, or embeddedness 20-30% if dominant	Bedrock, sand, silt, or small gravel dominant, or embeddedness >30% if gravel or cobble dominant
<b>Pct Fines &lt;2 mm in Riffles (R) or Pool Tails (P)</b>	-	-	-	-	-	-	<12% fines <sup>8</sup> in gravel	12-20% fines <sup>8</sup> in gravel	>20% fines <sup>8</sup> in gravel
<b>Percent Stable</b>	60.0	65-79	65-79	79.3	>80	>90	>90% stable	80-90% stable	< 80% stable

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data				PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
							Properly Functioning	At Risk	Not Properly Functioning
<b><i>Banks (CS &amp; FB)</i></b>									
<b>Percent Stable Banks (CS, FB, US)</b>	-	-	-	-	-	-	-	-	-
<b>Percent Undercut Banks</b>	-	-	-	-	>75	50-75% undercut <sup>9</sup>	-	-	-
<b><i>Large Wood Frequency (#/mi)<sup>14</sup></i></b>	18.9 <sup>10</sup>	23.2 <sup>11</sup>	-	57.2 <sup>11</sup>	>20 <sup>13</sup>	20-70 <sup>10</sup> 80-120 <sup>11</sup> 100-350 <sup>12</sup>	>20 <sup>13</sup> and adequate sources for recruitment	>20 but lacks recruitment to maintain	<20 and lacks recruitment
<b><i>Percent Shade/Canopy Closure</i></b>	54.0	51.0	28.0	43.0	-	40-55 <sup>15</sup> 50-65 <sup>16</sup> 60-75 <sup>17</sup> 80 <sup>18</sup>	-	-	-
<b>Greenline Wetland Rating</b>	-	-	-	-	-	-	-	-	-
<b>Greenline Woody Cover</b>	-	-	-	-	-	-	-	-	-
<b><i>Physical Man-made Barriers<sup>19</sup></i></b>	Two barrier culverts	None	None	Two barrier culverts	-	-	Any in watershed allow passage @ all flows	Any don't allow passage @ base flows	Any don't allow passage @ range of flows
<b><i>Off-channel Habitat &amp; Refugia</i></b>	-	-	-	-	-	-	Low energy backwaters & side channels	Some backwaters & high energy side channels	Few or no backwaters

Notes: **1)** All PIBO data units converted from metric to English except for mm measurements; **2)** Channels of <10 feet in width; **3)** Channels of >10 to 20 feet in width; **4)** Channels of >20 to 25 feet in width; **5)** Channels of >25 to 50 feet in width; **6)** Criteria is for wetted W/D ratio; **7)** Criteria is for bankfull W/D ratio; **8)** Fines defined as <0.85mm in gravel; **9)** In non-forested systems with 2% or less gradient; **10)** In Ponderosa

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pine ecosystems (at least 12 inches in diameter and 20% > 20 inches in diameter; and at least 35 feet long or 1.5 times bankfull width); **11)** In mixed conifer ecosystems (at least 12 inches in diameter and 20% > 20 inches in diameter; and at least 35 feet long or 1.5 times bankfull width); **12)** In Lodgepole pine ecosystems (at least 6 inches in diameter and 10% > 12 inches in diameter; and at least 18 feet long or 1.5 times bankfull width); **13)** LWD defined as >12 inch diameter and > 35 ft length; **14)** Stream surveys conducted in 1995 and earlier **a)** included not only LW material within the bankfull channel, but also leaning trees that have the potential to fall into the stream, and **b)** included a “Brush” LWD category that is not considered functional LWD as per Amendment 29 DFCs and the MPI unless in Lodgepole Pine ecosystems. Stream surveys conducted in 1996 and later **a)** only included trees actually within the bankfull channel interacting with stream flow during bankfull conditions, and **b)** included a “Small” LWD category that is not considered functional LWD as described above; **15)** In Ponderosa pine ecosystems; **16)** In mixed conifer ecosystems; **17)** In Lodgepole pine ecosystems; **18)** In hardwood/meadow complexes; **19)** Culvert barrier data from MNF Culvert Assessment GIS layer.

**Table 3. Summary of Available R6 Stream Survey and PIBO Data vs. Fish Habitat Standards for Streams within Allotments.  
Crazy Creek**

PIBO Data <sup>1</sup> ( <b>Bold</b> ) <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data		PIBO Effectiveness Monitoring Data		PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
							Properly Functioning	At Risk	Not Properly Functioning
Stream Name	<b>Crazy Creek Reach 1</b>	<b>Crazy Creek Reach 1</b>	<b>Crazy Creek Reach 1</b>	<b>Crazy Creek Reach 1</b>	-	-	-	-	-
Pasture Name	Timber Mountain	Timber Mountain	Timber Mountain	Timber Mountain	-	-	-	-	-
Survey Date	1992 (July 1-3)	2009 (July 7)	2003	2008	-	-	-	-	-
<b>Sample Type</b>	-	-	K	K	-	-	-	-	-
6 <sup>th</sup> Field HUC	170702010 402	6635	6635	6635	-	-	-	-	-
<b><i>Av Bankfull (B) and/or Wetted (W) Width (feet)</i></b>	W 4.9	W 5.3 B 13.6	-	-	-	-	-	-	-
<b><i>Av Gradient (%)</i></b>	3.0	5.5	-	-	-	-	-	-	-

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	<b>R6 Level II Stream Survey Data</b>		<b>PIBO Effectiveness Monitoring Data</b>		<b>PAC FISH RMO</b>	<b>Amend 29 DFC</b>	<b>NMFS Matrix of Pathways and Indicators Ranges of Criteria</b>		
							<b>Properly Functioning</b>	<b>At Risk</b>	<b>Not Properly Functioning</b>
<b>Residual Pool Depth (feet)</b>	0.6	0.8	-	0.16	-	-	-	-	-
<b>Pool Frequency (#/mi)</b>	121.48	75.0	-	-	96 <sup>2</sup> 56 <sup>3</sup> 47 <sup>4</sup> 26 <sup>5</sup>	75-132 <sup>2</sup> 38-66 <sup>3</sup> 30-53 <sup>4</sup> 15-26 <sup>5</sup>	Meets pool freq & LWD recruitment standards channel width    # pools/mile 5 feet            184 10 "              96 15 "              70 20 "              56 25 "              47 50 "              26	Meets pool freq standards but not LWD recruitment	Does not meet pool freq standards
<i>Pool Quality</i>	No >1m deep pools, max spot temp 57.2F	No >1m deep pools, max spot temp 60.8 F	-	-	-	-	Pools >1m (3.28ft) deep, good cover, cool water, minimal filling	Few >1m pools or inadequate cover/temp, moderate filling	No >1m pools & inadequate cover/temp, major filling with sediment
<b>Percent Pools</b>	43.3	27.6	-	31.7	-	-	-	-	-
<b>Bankfull (B) or Wetted (W) W/D Ratio</b>	B 10.9	B 13.6	-	B 32.9	<10 <sup>6</sup>	<10 <sup>6</sup>	<10 <sup>7</sup>	10-12 <sup>7</sup>	>12 <sup>7</sup>
<b>D50 (mm), or Dominant Substrate &amp; Embeddedness</b>	Gravel, Embeddedness >35%	15.0	-	-	-	Embedded <=20%	Dominant substrate gravel (2-64 mm) or cobble (64-256 mm) (interstitial spaces clear), or embeddedness <20%	Gravel or cobble subdominant, or embeddedness 20-30% if dominant	Bedrock, sand, silt, or small gravel dominant, or embeddedness >30% if gravel or cobble dominant
<b>Pct Fines &lt;2 mm in Riffles (R) or Pool</b>	-	-	-	-	-	-	<12% fines <sup>8</sup> in gravel	12-20% fines <sup>8</sup> in gravel	>20% fines <sup>8</sup> in gravel



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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	<b>R6 Level II Stream Survey Data</b>		<b>PIBO Effectiveness Monitoring Data</b>		<b>PAC FISH RMO</b>	<b>Amend 29 DFC</b>	<b>NMFS Matrix of Pathways and Indicators Ranges of Criteria</b>		
							<b>Properly Functioning</b>	<b>At Risk</b>	<b>Not Properly Functioning</b>
<b><i>Tails (P)</i></b>									
<b><i>Percent Stable Banks (CS &amp; FB)</i></b>	97.0	98.5	83.3	88.1	>80	>90	>90% stable	80-90% stable	< 80% stable
<b><i>Percent Stable Banks (CS, FB, US)</i></b>	-	-	-	-	-	-	-	-	-
<b><i>Percent Undercut Banks</i></b>	-	-	14.3	7.3	>75	50-75% undercut <sup>9</sup>	-	-	-
<b><i>Large Wood Frequency (#/mi)<sup>14</sup></i></b>	22.0 <sup>11</sup> , Poor Recruitment	6.3 <sup>11</sup> , Poor Recruitment	-	-	>20 <sup>13</sup>	20-70 <sup>10</sup> 80-120 <sup>11</sup> 100-350 <sup>12</sup>	>20 <sup>13</sup> and adequate sources for recruitment	>20 but lacks recruitment to maintain	<20 and lacks recruitment
<b><i>Percent Shade/Canopy Closure</i></b>	69	-	-	-	-	40-55 <sup>15</sup> 50-65 <sup>16</sup> 60-75 <sup>17</sup> 80 <sup>18</sup>	-	-	-
<b><i>Greenline Wetland Rating</i></b>	-	-	57.2	59.8	-	-	-	-	-
<b><i>Greenline Woody Cover</i></b>	-	-	84.9	69.9	-	-	-	-	-
<b><i>Physical Man-made Barriers<sup>19</sup></i></b>	None	None	-	-	-	-	Any in watershed allow passage @ all flows	Any don't allow passage @ base flows	Any don't allow passage @ range of flows
<b><i>Off-channel Habitat &amp; Refugia</i></b>	Side channels on 3.2% of reach	Side channels on 1.41% of reach	-	-	-	-	Low energy backwaters & side channels	Some backwaters & high energy side channels	Few or no backwaters

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Notes: **1)** All PIBO data units converted from metric to English except for mm measurements; **2)** Channels of <10 feet in width; **3)** Channels of >10 to 20 feet in width; **4)** Channels of >20 to 25 feet in width; **5)** Channels of >25 to 50 feet in width; **6)** Criteria is for wetted W/D ratio; **7)** Criteria is for bankfull W/D ratio; **8)** Fines defined as <0.85mm in gravel; **9)** In non-forested systems with 2% or less gradient; **10)** In Ponderosa pine ecosystems (at least 12 inches in diameter and 20% > 20 inches in diameter; and at least 35 feet long or 1.5 times bankfull width); **11)** In mixed conifer ecosystems (at least 12 inches in diameter and 20% > 20 inches in diameter; and at least 35 feet long or 1.5 times bankfull width); **12)** In Lodgepole pine ecosystems (at least 6 inches in diameter and 10% > 12 inches in diameter; and at least 18 feet long or 1.5 times bankfull width); **13)** LWD defined as >12 inch diameter and > 35 ft length; **14)** Stream surveys conducted in 1995 and earlier **a)** included not only LW material within the bankfull channel, but also leaning trees that have the potential to fall into the stream, and **b)** included a “Brush” LWD category that is not considered functional LWD as per Amendment 29 DFCs and the MPI unless in Lodgepole Pine ecosystems. Stream surveys conducted in 1996 and later **a)** only included trees actually within the bankfull channel interacting with stream flow during bankfull conditions, and **b)** included a “Small” LWD category that is not considered functional LWD as described above; **15)** In Ponderosa pine ecosystems; **16)** In mixed conifer ecosystems; **17)** In Lodgepole pine ecosystems; **18)** In hardwood/meadow complexes; **19)** Culvert barrier data from MNF Culvert Assessment GIS layer.

**Table 4. Summary of Available R6 Stream Survey Data vs. Fish Habitat Standards for Streams within Allotments.  
Deer Creek**

PIBO Data <sup>1</sup> ( <b>Bold</b> ) <i>R6 Survey Protocol</i> ( <i>Italics</i> ) <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data				PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
							Properly Functioning	At Risk	Not Properly Functioning
Stream Name	Deer Creek Reaches 1- 10	Deer Creek Reaches 1- 4	Deer Creek Reaches 11-13	Deer Creek Reach 5	-	-	-	-	-
Pasture Name	Frenchy Butte	Frenchy Butte	Deer Creek	Deer Creek	-	-	-	-	-
Survey Date	1991 (July 27)	2007 (July 30-Aug 2)	1991 (Jul 27)	2007 (Jul 30-Aug 2)	-	-	-	-	-
Sample Type	-	-	-	-	-	-	-	-	-
6 <sup>th</sup> Field HUC	170702010 206	170702010 206	170702010 205	170702010 205	-	-	-	-	-
<b><i>Av Bankfull (B) and/or Wetted (W)</i></b>	B 18.8 W 13.6	W 7.6	W 9.4	W 6.5	-	-	-	-	-

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data				PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
							Properly Functioning	At Risk	Not Properly Functioning
<b>Width (feet)</b>									
<b>Av Gradient (%)</b>	1.5	1.6	1.0	1.6	-	-	-	-	-
<b>Residual Pool Depth (feet)</b>	1.7	1.7	1.4	1.6	-	-	-	-	-
<b>Pool Frequency (#/mi)</b>	36.1	26.2	37.9	26.3	96 <sup>2</sup> 56 <sup>3</sup> 47 <sup>4</sup> 26 <sup>5</sup>	75-132 <sup>2</sup> 38-66 <sup>3</sup> 30-53 <sup>4</sup> 15-26 <sup>5</sup>	Meets pool freq & LWD recruitment standards channel width    # pools/mile 5 feet            184 10 "              96 15 "              70 20 "              56 25 "              47 50 "              26	Meets pool freq standards but not LWD recruitment	Does not meet pool freq standards
<b>Pool Quality</b>	10 >1m deep pools, Max spot temp 59F	2 >1m deep pools, Max spot temp 59F	1 >1m deep pool, Max spot temp 59F	No >1m deep pools, Max spot temp 57F	-	-	Pools >1m (3.28ft) deep, good cover, cool water, minimal filling	Few >1m pools or inadequate cover/temp, moderate filling	No >1m pools & inadequate cover/temp, major filling with sediment
<b>Percent Pools</b>	28.54	-	31.17	-	-	-	-	-	-
<b>Bankfull (B) or Wetted (W) W/D Ratio</b>	B 16.4	B15.7	-	B12.7	<10 <sup>6</sup>	<10 <sup>6</sup>	<10 <sup>7</sup>	10-12 <sup>7</sup>	>12 <sup>7</sup>
<b>D50 (mm), or Dominant Substrate &amp; Embeddedness</b>	Cobble, Embedded ness >35%	Gravel, Embedded ness >35%	Cobble, Embedded ness >35%	Gravel, Embedded ness not >35%	-	Embedded ≤20%	Dominant substrate gravel (2-64 mm) or cobble (64-256 mm) (interstitial spaces clear), or	Gravel or cobble subdominant, or embeddedness 20-30% if dominant	Bedrock, sand, silt, or small gravel dominant, or embeddedness >30% if gravel or

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data				PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
							Properly Functioning	At Risk	Not Properly Functioning
							embeddedness <20%		cobble dominant
<b><i>Pct Fines &lt;2 mm in Riffles (R) or Pool Tails (P)</i></b>	-	-	-	-	-	-	<12% fines <sup>8</sup> in gravel	12-20% fines <sup>8</sup> in gravel	>20% fines <sup>8</sup> in gravel
<b><i>Percent Stable Banks (CS &amp; FB)</i></b>	-	96.0	-	96.0	>80	>90	>90% stable	80-90% stable	< 80% stable
<b>Percent Stable Banks (CS, FB, US)</b>	-	-	-	-	-	-	-	-	-
<b>Percent Undercut Banks</b>	-	-	-	-	>75	50-75% undercut <sup>9</sup>	-	-	-
<b><i>Large Wood Frequency (#/mi)<sup>14</sup></i></b>	55 <sup>10</sup> , Poor Recruitmen t	27 <sup>10</sup>	34 <sup>10</sup> , Poor Recruitmen t	48 <sup>10</sup>	>20 <sup>13</sup>	20-70 <sup>10</sup> 80-120 <sup>11</sup> 100-350 <sup>12</sup>	>20 <sup>13</sup> and adequate sources for recruitment	>20 but lacks recruitment to maintain	<20 and lacks recruitment
<b><i>Percent Shade/Canopy Closure</i></b>	-	48.8	-	44.0	-	40-55 <sup>15</sup> 50-65 <sup>16</sup> 60-75 <sup>17</sup> 80 <sup>18</sup>	-	-	-
<b>Greenline Wetland Rating</b>	-	-	-	-	-	-	-	-	-
<b>Greenline Woody Cover</b>	-	-	-	-	-	-	-	-	-
<b><i>Physical Man-made Barriers<sup>19</sup></i></b>	4 culvert barriers	4 culvert barriers	3 culvert barriers	3 culvert barriers	-	-	Any in watershed allow passage @ all flows	Any don't allow passage @ base flows	Any don't allow passage @ range of flows

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PIBO Data <sup>1</sup> (Bold) <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data				PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
							Properly Functioning	At Risk	Not Properly Functioning
<i>Off-channel Habitat &amp; Refugia</i>	-	Side channels on 0.9% of reaches	-	Side channels on 0.4% of reach	-	-	Low energy backwaters & side channels	Some backwaters & high energy side channels	Few or no backwaters

Notes: **1)** All PIBO data units converted from metric to English except for mm measurements; **2)** Channels of <10 feet in width; **3)** Channels of >10 to 20 feet in width; **4)** Channels of >20 to 25 feet in width; **5)** Channels of >25 to 50 feet in width; **6)** Criteria is for wetted W/D ratio; **7)** Criteria is for bankfull W/D ratio; **8)** Fines defined as <0.85mm in gravel; **9)** In non-forested systems with 2% or less gradient; **10)** In Ponderosa pine ecosystems (at least 12 inches in diameter and 20% > 20 inches in diameter; and at least 35 feet long or 1.5 times bankfull width); **11)** In mixed conifer ecosystems (at least 12 inches in diameter and 20% > 20 inches in diameter; and at least 35 feet long or 1.5 times bankfull width); **12)** In Lodgepole pine ecosystems (at least 6 inches in diameter and 10% > 12 inches in diameter; and at least 18 feet long or 1.5 times bankfull width); **13)** LWD defined as >12 inch diameter and > 35 ft length; **14)** Stream surveys conducted in 1995 and earlier **a)** included not only LW material within the bankfull channel, but also leaning trees that have the potential to fall into the stream, and **b)** included a "Brush" LWD category that is not considered functional LWD as per Amendment 29 DFCs and the MPI unless in Lodgepole Pine ecosystems. Stream surveys conducted in 1996 and later **a)** only included trees actually within the bankfull channel interacting with stream flow during bankfull conditions, and **b)** included a "Small" LWD category that is not considered functional LWD as described above; **15)** In Ponderosa pine ecosystems; **16)** In mixed conifer ecosystems; **17)** In Lodgepole pine ecosystems; **18)** In hardwood/meadow complexes; **19)** Culvert barrier data from MNF Culvert Assessment GIS layer.

**Table 5. Summary of Available R6 Stream Survey Data vs. Fish Habitat Standards for Streams within Allotments.  
Duncan Creek**

PIBO Data <sup>1</sup> (Bold) <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data			PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
						Properly Functioning	At Risk	Not Properly Functioning
Stream Name	Duncan Creek Reach 1	Duncan Creek Reaches 1-3	Duncan Creek Reaches 3-4	-	-	-	-	-
Pasture Name	Martin Corrals	Red Rocks	Oregon Mine	-	-	-	-	-

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PIBO Data <sup>1</sup> (Bold) <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data			PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
						Properly Functioning	At Risk	Not Properly Functioning
Survey Date	1994 (Sept 14-28)	1994 (Sept 14-28)	1994 (Sept 14-28)	-	-	-	-	-
Sample Type	-	-	-	-	-	-	-	-
6 <sup>th</sup> Field HUC	170702010303	6677	6677	-	-	-	-	-
<b><i>Av Bankfull (B) and/or Wetted (W) Width (feet)</i></b>	B 13.9 W 8.6	B 12.7 W 6.8	B 14.1 W 4.3	-	-	-	-	-
<b><i>Av Gradient (%)</i></b>	5.0	4.7	7.0	-	-	-	-	-
<b><i>Residual Pool Depth (feet)</i></b>	0.9	0.8	0.6	-	-	-	-	-
<b><i>Pool Frequency (#/mi)</i></b>	36.5	31.0	31.9	96 <sup>2</sup> 56 <sup>3</sup> 47 <sup>4</sup> 26 <sup>5</sup>	75-132 <sup>2</sup> 38-66 <sup>3</sup> 30-53 <sup>4</sup> 15-26 <sup>5</sup>	Meets pool freq & LWD recruitment standards channel width    # pools/mile 5 feet            184 10 "              96 15 "              70 20 "              56 25 "              47 50 "              26	Meets pool freq standards but not LWD recruitment	Does not meet pool freq standards
<b><i>Pool Quality</i></b>	0 >1m deep pools, max spot temp 52.0F	0 >1m deep pools, max spot temp 52.0F	0 >1m deep pools, max spot temp 52.0F		-	Pools >1m (3.28ft) deep, good cover, cool water, minimal filling	Few >1m pools or inadequate cover/temp, moderate filling	No >1m pools & inadequate cover/temp, major filling with sediment
<b><i>Percent Pools</i></b>	16.4	11.9	8.4	-	-	-	-	-
<b><i>Bankfull (B) or Wetted (W) W/D</i></b>	B 6.0	B 5.6	B 7.9	<10 <sup>6</sup>	<10 <sup>6</sup>	<10 <sup>7</sup>	10-12 <sup>7</sup>	>12 <sup>7</sup>

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	<b>R6 Level II Stream Survey Data</b>			<b>PAC FISH RMO</b>	<b>Amend 29 DFC</b>	<b>NMFS Matrix of Pathways and Indicators Ranges of Criteria</b>		
						<b>Properly Functioning</b>	<b>At Risk</b>	<b>Not Properly Functioning</b>
<b>Ratio</b>								
<b>D50 (mm), or Dominant Substrate &amp; Embeddedness</b>	Gravel, Embeddedness >35%	Gravel, Embeddedness >35%	Gravel, Embeddedness >35%	-	Embedded <=20%	Dominant substrate gravel (2-64 mm) or cobble (64-256 mm) (interstitial spaces clear), or embeddedness <20%	Gravel or cobble subdominant, or embeddedness 20-30% if dominant	Bedrock, sand, silt, or small gravel dominant, or embeddedness >30% if gravel or cobble dominant
<b>Pct Fines &lt;2 mm in Riffles (R) or Pool Tails (P)</b>	-	-	-	-	-	<12% fines <sup>8</sup> in gravel	12-20% fines <sup>8</sup> in gravel	>20% fines <sup>8</sup> in gravel
<b>Percent Stable Banks (CS &amp; FB)</b>	83.0	92.7	100.0	>80	>90	>90% stable	80-90% stable	< 80% stable
<b>Percent Stable Banks (CS, FB, US)</b>	-	-	-	-	-	-	-	-
<b>Percent Undercut Banks</b>	-	-	-	>75	50-75% undercut <sup>9</sup>	-	-	-
<b>Large Wood Frequency (#/mi)<sup>14</sup></b>	45.0 <sup>11</sup> Good Recruitment	87.3 <sup>11</sup> Fair Recruitment	114.8 <sup>11</sup> Low Recruitment	>20 <sup>13</sup>	20-70 <sup>10</sup> 80-120 <sup>11</sup> 100-350 <sup>12</sup>	>20 <sup>13</sup> and adequate sources for recruitment	>20 but lacks recruitment to maintain	<20 and lacks recruitment
<b>Percent Shade/Canopy Closure</b>	> 60.0	> 60.0	> 60.0	-	40-55 <sup>15</sup> 50-65 <sup>16</sup> 60-75 <sup>17</sup> 80 <sup>18</sup>	-	-	-
<b>Greenline Wetland Rating</b>	-	-	-	-	-	-	-	-

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data			PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
						Properly Functioning	At Risk	Not Properly Functioning
<b>Greenline Woody Cover</b>	-	-	-	-	-	-	-	-
<i>Physical Man-made Barriers<sup>19</sup></i>	None	None	One barrier culvert	-	-	Any in watershed allow passage @ all flows	Any don't allow passage @ base flows	Any don't allow passage @ range of flows
<i>Off-channel Habitat &amp; Refugia</i>	17 side channels, 6% of reach	76 side channels, average 4.5% of reaches	50 side channels, average <4% of reaches	-	-	Low energy backwaters & side channels	Some backwaters & high energy side channels	Few or no backwaters

Notes: **1)** All PIBO data units converted from metric to English except for mm measurements; **2)** Channels of <10 feet in width; **3)** Channels of >10 to 20 feet in width; **4)** Channels of >20 to 25 feet in width; **5)** Channels of >25 to 50 feet in width; **6)** Criteria is for wetted W/D ratio; **7)** Criteria is for bankfull W/D ratio; **8)** Fines defined as <0.85mm in gravel; **9)** In non-forested systems with 2% or less gradient; **10)** In Ponderosa pine ecosystems (at least 12 inches in diameter and 20% > 20 inches in diameter; and at least 35 feet long or 1.5 times bankfull width); **11)** In mixed conifer ecosystems (at least 12 inches in diameter and 20% > 20 inches in diameter; and at least 35 feet long or 1.5 times bankfull width); **12)** In Lodgepole pine ecosystems (at least 6 inches in diameter and 10% > 12 inches in diameter; and at least 18 feet long or 1.5 times bankfull width); **13)** LWD defined as >12 inch diameter and > 35 ft length; **14)** Stream surveys conducted in 1995 and earlier **a)** included not only LW material within the bankfull channel, but also leaning trees that have the potential to fall into the stream, and **b)** included a "Brush" LWD category that is not considered functional LWD as per Amendment 29 DFCs and the MPI unless in Lodgepole Pine ecosystems. Stream surveys conducted in 1996 and later **a)** only included trees actually within the bankfull channel interacting with stream flow during bankfull conditions, and **b)** included a "Small" LWD category that is not considered functional LWD as described above; **15)** In Ponderosa pine ecosystems; **16)** In mixed conifer ecosystems; **17)** In Lodgepole pine ecosystems; **18)** In hardwood/meadow complexes; **19)** Culvert barrier data from MNF Culvert Assessment GIS layer.

**Table 6. Summary of Available R6 Stream Survey Data vs. Fish Habitat Standards for Streams within Allotments.  
East and West Tributaries Duncan Creek**

<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data			PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
						Properly Functioning	At Risk	Not Properly Functioning



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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data		PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
					Properly Functioning	At Risk	Not Properly Functioning
Stream Name	East Tributary Duncan Creek Reach 1	West Tributary Duncan Creek Reach 1	-	-	-	-	-
Pasture Name	Red Rocks, Oregon Mine	Oregon Mine	-	-	-	-	-
Survey Date	1994 (Sept 23)	1994 (Sept 30)	-	-	-	-	-
Sample Type	-	-	-	-	-	-	-
6 <sup>th</sup> Field HUC	170702010303	“”	-	-	-	-	-
<b>Av Bankfull (B)</b> <b>and/or Wetted (W)</b> <b>Width (feet)</b>	B 10.0 W 3.4	B 15.0 W 3.0	-	-	-	-	-
<b>Av Gradient (%)</b>	10.0	10.0	-	-	-	-	-
<b>Residual Pool Depth (feet)</b>	0.6	0.4	-	-	-	-	-
<b>Pool Frequency (#/mi)</b>	28.9	31.6	96 <sup>2</sup> 56 <sup>3</sup> 47 <sup>4</sup> 26 <sup>5</sup>	75-132 <sup>2</sup> 38-66 <sup>3</sup> 30-53 <sup>4</sup> 15-26 <sup>5</sup>	Meets pool freq & LWD recruitment standards channel width    # pools/mile 5 feet            184 10 "              96 15 "              70 20 "              56 25 "              47 50 "              26	Meets pool freq standards but not LWD recruitment	Does not meet pool freq standards
<b>Pool Quality</b>	0 >1m deep pools, max spot temp 54.0F	0 >1m deep pools		-	Pools >1m (3.28ft) deep, good cover, cool water, minimal filling	Few >1m pools or inadequate cover/temp, moderate filling	No >1m pools & inadequate cover/temp, major filling with sediment

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	<b>R6 Level II Stream Survey Data</b>		<b>PAC FISH RMO</b>	<b>Amend 29 DFC</b>	<b>NMFS Matrix of Pathways and Indicators Ranges of Criteria</b>		
					<b>Properly Functioning</b>	<b>At Risk</b>	<b>Not Properly Functioning</b>
<b>Percent Pools</b>	5.9	4.1	-	-	-	-	-
<b>Bankfull (B) or Wetted (W) W/D Ratio</b>	B 5.0	B 10.0	<10 <sup>6</sup>	<10 <sup>6</sup>	<10 <sup>7</sup>	10-12 <sup>7</sup>	>12 <sup>7</sup>
<b>D50 (mm), or Dominant Substrate &amp; Embeddedness</b>	Gravel, Embeddedness >35%	Gravel, Embeddedness >35%	-	Embedded <=20%	Dominant substrate gravel (2-64 mm) or cobble (64-256 mm) (interstitial spaces clear), or embeddedness <20%	Gravel or cobble subdominant, or embeddedness 20-30% if dominant	Bedrock, sand, silt, or small gravel dominant, or embeddedness >30% if gravel or cobble dominant
<b>Pct Fines &lt;2 mm in Riffles (R) or Pool Tails (P)</b>	-	-	-	-	<12% fines <sup>8</sup> in gravel	12-20% fines <sup>8</sup> in gravel	>20% fines <sup>8</sup> in gravel
<b>Percent Stable Banks (CS &amp; FB)</b>	56.0	67.0	>80	>90	>90% stable	80-90% stable	< 80% stable
<b>Percent Stable Banks (CS, FB, US)</b>	-	-	-	-	-	-	-
<b>Percent Undercut Banks</b>	-	-	>75	50-75% undercut <sup>9</sup>	-	-	-
<b>Large Wood Frequency (#/mi)<sup>14</sup></b>	64.9 <sup>11</sup>	117.7 <sup>11</sup>	>20 <sup>13</sup>	20-70 <sup>10</sup> 80-120 <sup>11</sup> 100-350 <sup>12</sup>	>20 <sup>13</sup> and adequate sources for recruitment	>20 but lacks recruitment to maintain	<20 and lacks recruitment
<b>Percent Shade/Canopy Closure</b>	> 60.0	> 60.0	-	40-55 <sup>15</sup> 50-65 <sup>16</sup> 60-75 <sup>17</sup>	-	-	-

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PIBO Data <sup>1</sup> (Bold) <i>R6 Survey Protocol</i> <i>(Italics)</i> <i>Both (Bold &amp; Italics)</i>	R6 Level II Stream Survey Data		PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
					Properly Functioning	At Risk	Not Properly Functioning
				80 <sup>18</sup>			
<b>Greenline Wetland Rating</b>	-	-	-	-	-	-	-
<b>Greenline Woody Cover</b>	-	-	-	-	-	-	-
<i>Physical Man-made Barriers</i> <sup>19</sup>	None	One barrier culvert	-	-	Any in watershed allow passage @ all flows	Any don't allow passage @ base flows	Any don't allow passage @ range of flows
<i>Off-channel Habitat &amp; Refugia</i>	4 side channels	1 side channel	-	-	Low energy backwaters & side channels	Some backwaters & high energy side channels	Few or no backwaters

Notes: **1)** All PIBO data units converted from metric to English except for mm measurements; **2)** Channels of <10 feet in width; **3)** Channels of >10 to 20 feet in width; **4)** Channels of >20 to 25 feet in width; **5)** Channels of >25 to 50 feet in width; **6)** Criteria is for wetted W/D ratio; **7)** Criteria is for bankfull W/D ratio; **8)** Fines defined as <0.85mm in gravel; **9)** In non-forested systems with 2% or less gradient; **10)** In Ponderosa pine ecosystems (at least 12 inches in diameter and 20% > 20 inches in diameter; and at least 35 feet long or 1.5 times bankfull width); **11)** In mixed conifer ecosystems (at least 12 inches in diameter and 20% > 20 inches in diameter; and at least 35 feet long or 1.5 times bankfull width); **12)** In Lodgepole pine ecosystems (at least 6 inches in diameter and 10% > 12 inches in diameter; and at least 18 feet long or 1.5 times bankfull width); **13)** LWD defined as >12 inch diameter and > 35 ft length; **14)** Stream surveys conducted in 1995 and earlier **a)** included not only LW material within the bankfull channel, but also leaning trees that have the potential to fall into the stream, and **b)** included a "Brush" LWD category that is not considered functional LWD as per Amendment 29 DFCs and the MPI unless in Lodgepole Pine ecosystems. Stream surveys conducted in 1996 and later **a)** only included trees actually within the bankfull channel interacting with stream flow during bankfull conditions, and **b)** included a "Small" LWD category that is not considered functional LWD as described above; **15)** In Ponderosa pine ecosystems; **16)** In mixed conifer ecosystems; **17)** In Lodgepole pine ecosystems; **18)** In hardwood/meadow complexes; **19)** Culvert barrier data from MNF Culvert Assessment GIS layer.

**Table 7. Summary of Available R6 Stream Survey Data vs. Fish Habitat Standards for Streams within Allotments.  
Murderers Creek 1992**

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data				PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
							Properly Functioning	At Risk	Not Properly Functioning
Stream Name	<b>Murderers Cr Reaches 1-2</b>	<b>Murderer s Cr Reaches 2-6</b>	<b>Murderer s Cr Reaches 6-8</b>	<b>Murderer s Cr Reaches 8-9</b>	-	-	-	-	-
Pasture Name	Martin Corrals	Oregon Mine	Tex Cr Gather	Murderers Cr Gather	-	-	-	-	-
Survey Date	1992 (June 24- July 8)	1992 (June 24- July 8)	1992 (June 24- July 8)	1992 (June 24- July 8)	-	-	-	-	-
<b>Sample Type</b>	-	-	-	-	-	-	-	-	-
6 <sup>th</sup> Field HUC	170702010301	6639	6639	6639	-	-	-	-	-
<b><i>Av Bankfull (B) and/or Wetted (W) Width (feet)</i></b>	W 15.0	W 13.2	W 9.5	W 8.5	-	-	-	-	-
<b><i>Av Gradient (%)</i></b>	4.0	3.0	4.3	3.0	-	-	-	-	-
<b>Residual Pool Depth (feet)</b>	1.5	1.5	1.7	1.6	-	-	-	-	-
<b><i>Pool Frequency (#/mi)</i></b>	37.3	34.0	29.6	38.0	96 <sup>2</sup> 56 <sup>3</sup> 47 <sup>4</sup> 26 <sup>5</sup>	75-132 <sup>2</sup> 38-66 <sup>3</sup> 30-53 <sup>4</sup> 15-26 <sup>5</sup>	Meets pool freq & LWD recruitment standards channel width    # pools/mile 5 feet            184 10 "              96 15 "              70 20 "              56 25 "              47 50 "              26	Meets pool freq standards but not LWD recruitment	Does not meet pool freq standards

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol (Italics)</i> <b>Both (Bold &amp; Italics)</b>	<b>R6 Level II Stream Survey Data</b>				<b>PAC FISH RMO</b>	<b>Amend 29 DFC</b>	<b>NMFS Matrix of Pathways and Indicators Ranges of Criteria</b>		
							<b>Properly Functioning</b>	<b>At Risk</b>	<b>Not Properly Functioning</b>
<i>Pool Quality</i>	Max spot temp 64.4F	Max spot temp 68.0F	Max spot temp 62.6F	Max spot temp 69.8F	-	-	Pools >1m (3.28ft) deep, good cover, cool water, minimal filling	Few >1m pools or inadequate cover/temp, moderate filling	No >1m pools & inadequate cover/temp, major filling with sediment
<b>Percent Pools</b>	25.5	51.5	76.2	74.9	-	-	-	-	-
<b>Bankfull (B) or Wetted (W) W/D Ratio</b>	B 9.2	B 15.3	B 14.5	B 12.1	<10 <sup>6</sup>	<10 <sup>6</sup>	<10 <sup>7</sup>	10-12 <sup>7</sup>	>12 <sup>7</sup>
<b>D50 (mm), or Dominant Substrate &amp; Embeddedness</b>	Cobble. > 35% Embedded.	Cobble. > 35% Embedded.	Sand. > 35% Embedded.	Sand. > 35% Embedded.	-	Embedded <=20%	Dominant substrate gravel (2-64 mm) or cobble (64-256 mm) (interstitial spaces clear), or embeddedness <20%	Gravel or cobble subdominant, or embeddedness 20-30% if dominant	Bedrock, sand, silt, or small gravel dominant, or embeddedness >30% if gravel or cobble dominant
<b>Pct Fines &lt;2 mm in Riffles (R) or Pool Tails (P)</b>	-	-	-	-	-	-	<12% fines <sup>8</sup> in gravel	12-20% fines <sup>8</sup> in gravel	>20% fines <sup>8</sup> in gravel
<b>Percent Stable Banks (CS &amp; FB)</b>	-	-	98	-	>80	>90	>90% stable	80-90% stable	< 80% stable
<b>Percent Stable Banks (CS, FB, US)</b>	-	-	-	-	-	-	-	-	-
<b>Percent Undercut Banks</b>	-	-	-	-	>75	50-75% undercut <sup>9</sup>	-	-	-

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data				PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
							Properly Functioning	At Risk	Not Properly Functioning
<b><i>Large Wood Frequency (#/mi)<sup>14</sup></i></b>	77.6 <sup>10</sup> , low recruitment	29.4 <sup>10</sup> , low recruitment	19.6 <sup>10</sup> , low recruitment	46.9 <sup>10</sup> , low recruitment	>20 <sup>13</sup>	20-70 <sup>10</sup> 80-120 <sup>11</sup> 100-350 <sup>12</sup>	>20 <sup>13</sup> and adequate sources for recruitment	>20 but lacks recruitment to maintain	<20 and lacks recruitment
<i>Percent Shade/Canopy Closure</i>	81.5	50.8	40	40	-	40-55 <sup>15</sup> 50-65 <sup>16</sup> 60-75 <sup>17</sup> 80 <sup>18</sup>	-	-	-
<b>Greenline Wetland Rating</b>	-	-	-	-	-	-	-	-	-
<b>Greenline Woody Cover</b>	-	-	-	-	-	-	-	-	-
<i>Physical Man-made Barriers<sup>19</sup></i>	None	2 Barrier Culverts (Reach 6)	2 Barrier Culverts (Reach 6)	1 Barrier Culvert (Reach 9)	-	-	Any in watershed allow passage @ all flows	Any don't allow passage @ base flows	Any don't allow passage @ range of flows
<i>Off-channel Habitat &amp; Refugia</i>	Side channels on 2.0% of reaches	Side channels on 2.8% of reaches, beaver ponds	Side channels on 3.9% of reaches, beaver ponds	Side channels on 1.6% of reaches, beaver ponds	-	-	Low energy backwaters & side channels	Some backwaters & high energy side channels	Few or no backwaters

Notes: **1)** All PIBO data units converted from metric to English except for mm measurements; **2)** Channels of <10 feet in width; **3)** Channels of >10 to 20 feet in width; **4)** Channels of >20 to 25 feet in width; **5)** Channels of >25 to 50 feet in width; **6)** Criteria is for wetted W/D ratio; **7)** Criteria is for bankfull W/D ratio; **8)** Fines defined as <0.85mm in gravel; **9)** In non-forested systems with 2% or less gradient; **10)** In Ponderosa pine ecosystems (at least 12 inches in diameter and 20% > 20 inches in diameter; and at least 35 feet long or 1.5 times bankfull width); **11)** In mixed conifer ecosystems (at least 12 inches in diameter and 20% > 20 inches in diameter; and at least 35 feet long or 1.5 times bankfull width); **12)** In Lodgepole pine ecosystems (at least 6 inches in diameter and 10% > 12 inches in diameter; and at least 18 feet long or 1.5 times bankfull width); **13)** LWD defined as >12 inch diameter and > 35 ft length; **14)** Stream surveys conducted in 1995 and earlier **a)** included not only LW

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material within the bankfull channel, but also leaning trees that have the potential to fall into the stream, and **b)** included a “Brush” LWD category that is not considered functional LWD as per Amendment 29 DFCs and the MPI unless in Lodgepole Pine ecosystems. Stream surveys conducted in 1996 and later **a)** only included trees actually within the bankfull channel interacting with stream flow during bankfull conditions, and **b)** included a “Small” LWD category that is not considered functional LWD as described above; **15)** In Ponderosa pine ecosystems; **16)** In mixed conifer ecosystems; **17)** In Lodgepole pine ecosystems; **18)** In hardwood/meadow complexes; **19)** Culvert barrier data from MNF Culvert Assessment GIS layer.

**Table 8. Summary of Available R6 Stream Survey Data vs. Fish Habitat Standards for Streams within Allotments.  
Murderers Creek 2005**

PIBO Data <sup>1</sup> ( <b>Bold</b> ) <i>R6 Survey Protocol</i> ( <i>Italics</i> ) <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data		PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
					Properly Functioning	At Risk	Not Properly Functioning
Stream Name	<b>Murderers Cr Reach 1</b>	<b>Murderers Cr Reach 2</b>	-	-	-	-	-
Pasture Name	Martin Corrals, Oregon Mine	Tex Cr Gather, Murderers Cr Gather	-	-	-	-	-
Survey Date	2005 (July 18-29)	2005 (July 18-29)	-	-	-	-	-
<b>Sample Type</b>	-	-	-	-	-	-	-
6 <sup>th</sup> Field HUC	170702010301	“”	-	-	-	-	-
<b><i>Av Bankfull (B) and/or Wetted (W) Width (feet)</i></b>	W 15.0 B 18.6	W 14.0 B 17.5	-	-	-	-	-
<b><i>Av Gradient (%)</i></b>	3.2	1.1	-	-	-	-	-
<b><i>Residual Pool Depth (feet)</i></b>	1.8	1.7	-	-	-	-	-
<b><i>Pool Frequency (#/mi)</i></b>	21.7	14.6	96 <sup>2</sup> 56 <sup>3</sup> 47 <sup>4</sup>	75-132 <sup>2</sup> 38-66 <sup>3</sup> 30-53 <sup>4</sup>	Meets pool freq & LWD recruitment standards channel width 5 feet    # pools/mile 184	Meets pool freq standards but not LWD	Does not meet pool freq standards

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data		PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
					Properly Functioning	At Risk	Not Properly Functioning
			26 <sup>5</sup>	15-26 <sup>5</sup>	10 "      96 15 "      70 20 "      56 25 "      47 50 "      26	recruitment	
<i>Pool Quality</i>	11>1m deep pools, Max spot temp 66.2F	4 >1m deep pools, Max spot temp 66.2F	-	-	Pools >1m (3.28ft) deep, good cover, cool water, minimal filling	Few >1m pools or inadequate cover/temp, moderate filling	No >1m pools & inadequate cover/temp, major filling with sediment
<b>Percent Pools</b>	-	-	-	-	-	-	-
<b>Bankfull (B) or Wetted (W) W/D Ratio</b>	B 11.1	B 10.3	<10 <sup>6</sup>	<10 <sup>6</sup>	<10 <sup>7</sup>	10-12 <sup>7</sup>	>12 <sup>7</sup>
<b>D50 (mm), or Dominant Substrate &amp; Embeddedness</b>	11	11	-	Embedded <=20%	Dominant substrate gravel (2-64 mm) or cobble (64-256 mm) (interstitial spaces clear), or embeddedness <20%	Gravel or cobble subdominant, or embeddedness 20-30% if dominant	Bedrock, sand, silt, or small gravel dominant, or embeddedness >30% if gravel or cobble dominant
<b>Pct Fines &lt;2 mm in Riffles (R) or Pool Tails (P)</b>	9	9	-	-	<12% fines <sup>8</sup> in gravel	12-20% fines <sup>8</sup> in gravel	>20% fines <sup>8</sup> in gravel
<b>Percent Stable Banks (CS &amp; FB)</b>	100	100	>80	>90	>90% stable	80-90% stable	< 80% stable
<b>Percent Stable Banks (CS, FB, US)</b>	-	-	-	-	-	-	-



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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data		PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
					Properly Functioning	At Risk	Not Properly Functioning
<b>Percent Undercut Banks</b>	-	-	>75	50-75% undercut <sup>9</sup>	-	-	-
<b><i>Large Wood Frequency (#/mi)</i><sup>14</sup></b>	12.0 <sup>10</sup> , low recruitment	14 <sup>10</sup> , low recruitment	>20 <sup>13</sup>	20-70 <sup>10</sup> 80-120 <sup>11</sup> 100-350 <sup>12</sup>	>20 <sup>13</sup> and adequate sources for recruitment	>20 but lacks recruitment to maintain	<20 and lacks recruitment
<i>Percent Shade/Canopy Closure</i>	-	-	-	40-55 <sup>15</sup> 50-65 <sup>16</sup> 60-75 <sup>17</sup> 80 <sup>18</sup>	-	-	-
<b>Greenline Wetland Rating</b>	-	-	-	-	-	-	-
<b>Greenline Woody Cover</b>	-	-	-	-	-	-	-
<i>Physical Man-made Barriers</i> <sup>19</sup>	None	2 Barrier Culverts	-	-	Any in watershed allow passage @ all flows	Any don't allow passage @ base flows	Any don't allow passage @ range of flows
<i>Off-channel Habitat &amp; Refugia</i>	Side channels on 1.2% of reach.	Side channels on 3.7% of reach.	-	-	Low energy backwaters & side channels	Some backwaters & high energy side channels	Few or no backwaters

Notes: **1)** All PIBO data units converted from metric to English except for mm measurements; **2)** Channels of <10 feet in width; **3)** Channels of >10 to 20 feet in width; **4)** Channels of >20 to 25 feet in width; **5)** Channels of >25 to 50 feet in width; **6)** Criteria is for wetted W/D ratio; **7)** Criteria is for bankfull W/D ratio; **8)** Fines defined as <0.85mm in gravel; **9)** In non-forested systems with 2% or less gradient; **10)** In Ponderosa pine ecosystems (at least 12 inches in diameter and 20% > 20 inches in diameter; and at least 35 feet long or 1.5 times bankfull width); **11)** In mixed conifer ecosystems (at least 12 inches in diameter and 20% > 20 inches in diameter; and at least 35 feet long or 1.5 times bankfull width); **12)** In Lodgepole pine ecosystems (at least 6 inches in diameter and 10% > 12 inches in diameter; and at least 18 feet long or 1.5 times bankfull width); **13)** LWD defined as >12 inch diameter and > 35 ft length; **14)** Stream surveys conducted in 1995 and earlier **a)** included not only LW material within the bankfull channel, but also leaning trees that have the potential to fall into the stream, and **b)** included a "Brush" LWD category

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that is not considered functional LWD as per Amendment 29 DFCs and the MPI unless in Lodgepole Pine ecosystems. Stream surveys conducted in 1996 and later **a)** only included trees actually within the bankfull channel interacting with stream flow during bankfull conditions, and **b)** included a “Small” LWD category that is not considered functional LWD as described above; **15)** In Ponderosa pine ecosystems; **16)** In mixed conifer ecosystems; **17)** In Lodgepole pine ecosystems; **18)** In hardwood/meadow complexes; **19)** Culvert barrier data from MNF Culvert Assessment GIS layer.

**Table 9. Summary of PIBO Effectiveness Monitoring Data vs. Fish Habitat Standards for Streams within Allotments. Murderers Creek**

PIBO Data <sup>1</sup> (Bold) <i>R6 Survey Protocol (Italics)</i> <i>Both (Bold &amp; Italics)</i>	PIBO Effectiveness Monitoring Data		PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
					Properly Functioning	At Risk	Not Properly Functioning
Stream Name	<b>Murderers Cr Reach 1</b>	<b>Murderers Cr Reach 1</b>	-	-	-	-	-
Pasture Name	Tex Cr Gather	Tex Cr Gather	-	-	-	-	-
Survey Date	2003	2008	-	-	-	-	-
<b>Sample Type</b>	I	I	-	-	-	-	-
6 <sup>th</sup> Field HUC	170702010301	“”	-	-	-	-	-
<b><i>Av Bankfull (B) and/or Wetted (W) Width (feet)</i></b>	-	-	-	-	-	-	-
<b><i>Av Gradient (%)</i></b>	-	-	-	-	-	-	-
<b>Residual Pool Depth (feet)</b>	0.37	0.53	-	-	-	-	-
<b><i>Pool Frequency (#/mi)</i></b>	-	-	96 <sup>2</sup> 56 <sup>3</sup> 47 <sup>4</sup> 26 <sup>5</sup>	75-132 <sup>2</sup> 38-66 <sup>3</sup> 30-53 <sup>4</sup> 15-26 <sup>5</sup>	Meets pool freq & LWD recruitment standards channel width 5 feet # pools/mile 184	Meets pool freq standards but not LWD recruitment	Does not meet pool freq standards

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	<b>PIBO Effectiveness Monitoring Data</b>		<b>PAC FISH RMO</b>	<b>Amend 29 DFC</b>	<b>NMFS Matrix of Pathways and Indicators Ranges of Criteria</b>		
					<b>Properly Functioning</b>	<b>At Risk</b>	<b>Not Properly Functioning</b>
					10 "      96 15 "      70 20 "      56 25 "      47 50 "      26		
<i>Pool Quality</i>	-	-	-	-	Pools >1m (3.28ft) deep, good cover, cool water, minimal filling	Few >1m pools or inadequate cover/temp, moderate filling	No >1m pools & inadequate cover/temp, major filling with sediment
<b>Percent Pools</b>	78.7	43.5	-	-	-	-	-
<b>Bankfull (B) or Wetted (W) W/D Ratio</b>	B 14.5	B 14.1	<10 <sup>6</sup>	<10 <sup>6</sup>	<10 <sup>7</sup>	10-12 <sup>7</sup>	>12 <sup>7</sup>
<b>D50 (mm), or Dominant Substrate &amp; Embeddedness</b>	0.01	0.01	-	Embedded <=20%	Dominant substrate gravel (2-64 mm) or cobble (64-256 mm) (interstitial spaces clear), or embeddedness <20%	Gravel or cobble subdominant, or embeddedness 20-30% if dominant	Bedrock, sand, silt, or small gravel dominant, or embeddedness >30% if gravel or cobble dominant
<b>Pct Fines &lt;2 mm in Riffles (R) or Pool Tails (P)</b>	P 40.5	P 37.7	-	-	<12% fines <sup>8</sup> in gravel	12-20% fines <sup>8</sup> in gravel	>20% fines <sup>8</sup> in gravel
<b>Percent Stable Banks (CS &amp; FB)</b>	72.7	93.2	>80	>90	>90% stable	80-90% stable	< 80% stable
<b>Percent Stable Banks (CS, FB, US)</b>	-	-	-	-	-	-	-

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	<b>PIBO Effectiveness Monitoring Data</b>		<b>PAC FISH RMO</b>	<b>Amend 29 DFC</b>	<b>NMFS Matrix of Pathways and Indicators Ranges of Criteria</b>		
					<b>Properly Functioning</b>	<b>At Risk</b>	<b>Not Properly Functioning</b>
<b>Percent Undercut Banks</b>	39.5	43.2	>75	50-75% undercut <sup>9</sup>	-	-	-
<b>Large Wood Frequency (#/mi)<sup>14</sup></b>	-	-	>20 <sup>13</sup>	20-70 <sup>10</sup> 80-120 <sup>11</sup> 100-350 <sup>12</sup>	>20 <sup>13</sup> and adequate sources for recruitment	>20 but lacks recruitment to maintain	<20 and lacks recruitment
<i>Percent Shade/Canopy Closure</i>	-	-	-	40-55 <sup>15</sup> 50-65 <sup>16</sup> 60-75 <sup>17</sup> 80 <sup>18</sup>	-	-	-
<b>Greenline Wetland Rating</b>	72.4	66.5	-	-	-	-	-
<b>Greenline Woody Cover</b>	44.5	36.4	-	-	-	-	-
<i>Physical Man-made Barriers<sup>19</sup></i>	-	-	-	-	Any in watershed allow passage @ all flows	Any don't allow passage @ base flows	Any don't allow passage @ range of flows
<i>Off-channel Habitat &amp; Refugia</i>	-	-	-	-	Low energy backwaters & side channels	Some backwaters & high energy side channels	Few or no backwaters

Notes: **1)** All PIBO data units converted from metric to English except for mm measurements; **2)** Channels of <10 feet in width; **3)** Channels of >10 to 20 feet in width; **4)** Channels of >20 to 25 feet in width; **5)** Channels of >25 to 50 feet in width; **6)** Criteria is for wetted W/D ratio; **7)** Criteria is for bankfull W/D ratio; **8)** Fines defined as <0.85mm in gravel; **9)** In non-forested systems with 2% or less gradient; **10)** In Ponderosa pine ecosystems (at least 12 inches in diameter and 20% > 20 inches in diameter; and at least 35 feet long or 1.5 times bankfull width); **11)** In mixed conifer ecosystems (at least 12 inches in diameter and 20% > 20 inches in diameter; and at least 35 feet long or 1.5 times bankfull width); **12)** In Lodgepole pine ecosystems (at least 6 inches in diameter and 10% > 12 inches in diameter; and at least 18 feet long or 1.5 times bankfull width); **13)** LWD defined as >12 inch diameter and > 35 ft length; **14)** Stream surveys conducted in 1995 and earlier **a)** included not only LW material within the bankfull channel, but also leaning trees that have the potential to fall into the stream, and **b)** included a "Brush" LWD category

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that is not considered functional LWD as per Amendment 29 DFCs and the MPI unless in Lodgepole Pine ecosystems. Stream surveys conducted in 1996 and later **a)** only included trees actually within the bankfull channel interacting with stream flow during bankfull conditions, and **b)** included a “Small” LWD category that is not considered functional LWD as described above; **15)** In Ponderosa pine ecosystems; **16)** In mixed conifer ecosystems; **17)** In Lodgepole pine ecosystems; **18)** In hardwood/meadow complexes; **19)** Culvert barrier data from MNF Culvert Assessment GIS layer.

**Table 10. Summary of Available R6 Stream Survey Data vs. Fish Habitat Standards for Streams within Allotments.  
South Fork Deer and North Fork Deer Creeks**

PIBO Data <sup>1</sup> ( <b>Bold</b> ) <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data				PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
							Properly Functioning	At Risk	Not Properly Functioning
Stream Name	<b>SF Deer Creek Reaches 1-2</b>	<b>SF Deer Creek Reaches 1-2</b>	<b>NF Deer Creek Reaches 1-4</b>	<b>NF Deer Creek Reaches 1-4</b>	-	-	-	-	-
Pasture Name	Deer Creek	Deer Creek	Deer Creek	Deer Creek	-	-	-	-	-
Survey Date	1993 (Aug 26)	2007 (Aug 1)	1993 (Aug 2)	2007 (Jul 30-31)	-	-	-	-	-
<b>Sample Type</b>	-	-	-	-	-	-	-	-	-
6 <sup>th</sup> Field HUC	170702010305	“”	“”	“”	-	-	-	-	-
<b><i>Av Bankfull (B) and/or Wetted (W) Width (feet)</i></b>	B 6.1 W 5.7	W 2.8	B 7.9 W 6.8	W 5.6	-	-	-	-	-
<b><i>Av Gradient (%)</i></b>	2.5	3.2	4.5	3.9	-	-	-	-	-
<b>Residual Pool Depth (feet)</b>	1.0	0.7	1.1	1.1	-	-	-	-	-

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data				PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
							Properly Functioning	At Risk	Not Properly Functioning
<b><i>Pool Frequency</i></b> <b><i>(#/mi)</i></b>	72.9	4.7	73.0	13.1	96 <sup>2</sup> 56 <sup>3</sup> 47 <sup>4</sup> 26 <sup>5</sup>	75-132 <sup>2</sup> 38-66 <sup>3</sup> 30-53 <sup>4</sup> 15-26 <sup>5</sup>	Meets pool freq & LWD recruitment standards channel width    # pools/mile 5 feet            184 10 "              96 15 "              70 20 "              56 25 "              47 50 "              26	Meets pool freq standards but not LWD recruitment	Does not meet pool freq standards
<b><i>Pool Quality</i></b>	No >1m deep pools, Max spot temp 53.0F	No >1m deep pools, Max spot temp 59.0F	8 >1m deep pools, Max spot temp 61.0F	No>1m deep pools, Max spot temp 63.0F	-	-	Pools >1m (3.28ft) deep, good cover, cool water, minimal filling	Few >1m pools or inadequate cover/temp, moderate filling	No >1m pools & inadequate cover/temp, major filling with sediment
<b><i>Percent Pools</i></b>	67.1	2.6	43.0	-	-	-	-	-	-
<b><i>Bankfull (B) or Wetted (W) W/D Ratio</i></b>	B 5.1 W 9.8	B 11.2	B 6.7	B 9.3	<10 <sup>6</sup>	<10 <sup>6</sup>	<10 <sup>7</sup>	10-12 <sup>7</sup>	>12 <sup>7</sup>
<b><i>D50 (mm), or Dominant Substrate &amp; Embeddedness</i></b>	Gravel, Embeddedness < 35%	Sand, Embeddedness >35%	Gravel, Embeddedness <35%	Sand (77.8%) Embeddedness >35%	-	Embedded <=20%	Dominant substrate gravel (2-64 mm) or cobble (64-256 mm) (interstitial spaces clear), or embeddedness <20%	Gravel or cobble subdominant, or embeddedness 20-30% if dominant	Bedrock, sand, silt, or small gravel dominant, or embeddedness >30% if gravel or cobble dominant
<b><i>Pct Fines &lt;2 mm in Riffles (R) or Pool Tails (P)</i></b>	-	-	-	-	-	-	<12% fines <sup>8</sup> in gravel	12-20% fines <sup>8</sup> in gravel	>20% fines <sup>8</sup> in gravel

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data				PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
							Properly Functioning	At Risk	Not Properly Functioning
<b>Percent Stable Banks (CS &amp; FB)</b>	-	100	-	99.6	>80	>90	>90% stable	80-90% stable	< 80% stable
<b>Percent Stable Banks (CS, FB, US)</b>	-	-	-	-	-	-	-	-	-
<b>Percent Undercut Banks</b>	-	-	-	-	>75	50-75% undercut <sup>9</sup>	-	-	-
<b>Large Wood Frequency (#/mi)<sup>14</sup></b>	30.5 <sup>10</sup> , Poor Recruitment	9 <sup>10</sup> , Poor Recruitment	62 <sup>10</sup>	9 <sup>10</sup>	>20 <sup>13</sup>	20-70 <sup>10</sup> 80-120 <sup>11</sup> 100-350 <sup>12</sup>	>20 <sup>13</sup> and adequate sources for recruitment	>20 but lacks recruitment to maintain	<20 and lacks recruitment
<b>Percent Shade/Canopy Closure</b>	-	49%	-	45.0	-	40-55 <sup>15</sup> 50-65 <sup>16</sup> 60-75 <sup>17</sup> 80 <sup>18</sup>	-	-	-
<b>Greenline Wetland Rating</b>	-	-	-	-	-	-	-	-	-
<b>Greenline Woody Cover</b>	-	-	-	-	-	-	-	-	-
<b>Physical Man-made Barriers<sup>19</sup></b>	2 culvert barriers	2 culvert barriers	2 culvert barriers	2 culvert barriers	-	-	Any in watershed allow passage @ all flows	Any don't allow passage @ base flows	Any don't allow passage @ range of flows
<b>Off-channel Habitat &amp; Refugia</b>	Side channels on 0.2% of reaches	Side channels on 7.7% of reaches	Side channels on 3.6% of reaches	Side channels on 0.6% of reaches	-	-	Low energy backwaters & side channels	Some backwaters & high energy side channels	Few or no backwaters

Notes: **1)** All PIBO data units converted from metric to English except for mm measurements; **2)** Channels of <10 feet in width; **3)** Channels of >10 to 20 feet in width; **4)** Channels of >20 to 25 feet in width; **5)** Channels of >25 to 50 feet in width; **6)** Criteria is for wetted W/D ratio; **7)**

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Criteria is for bankfull W/D ratio; **8)** Fines defined as <0.85mm in gravel; **9)** In non-forested systems with 2% or less gradient; **10)** In Ponderosa pine ecosystems (at least 12 inches in diameter and 20% > 20 inches in diameter; and at least 35 feet long or 1.5 times bankfull width); **11)** In mixed conifer ecosystems (at least 12 inches in diameter and 20% > 20 inches in diameter; and at least 35 feet long or 1.5 times bankfull width); **12)** In Lodgepole pine ecosystems (at least 6 inches in diameter and 10% > 12 inches in diameter; and at least 18 feet long or 1.5 times bankfull width); **13)** LWD defined as >12 inch diameter and > 35 ft length; **14)** Stream surveys conducted in 1995 and earlier **a)** included not only LW material within the bankfull channel, but also leaning trees that have the potential to fall into the stream, and **b)** included a "Brush" LWD category that is not considered functional LWD as per Amendment 29 DFCs and the MPI unless in Lodgepole Pine ecosystems. Stream surveys conducted in 1996 and later **a)** only included trees actually within the bankfull channel interacting with stream flow during bankfull conditions, and **b)** included a "Small" LWD category that is not considered functional LWD as described above; **15)** In Ponderosa pine ecosystems; **16)** In mixed conifer ecosystems; **17)** In Lodgepole pine ecosystems; **18)** In hardwood/meadow complexes; **19)** Culvert barrier data from MNF Culvert Assessment GIS layer.

**Table 11. Summary of PIBO Effectiveness Monitoring Data vs. Fish Habitat Standards for Streams within Allotments.  
South Fork Murderers and Deer Creeks**

PIBO Data <sup>1</sup> (Bold) <i>R6 Survey Protocol</i> <i>(Italics)</i> <i>Both (Bold &amp; Italics)</i>	PIBO Effectiveness Monitoring Data			PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
						Properly Functioning	At Risk	Not Properly Functioning
Stream Name	SF Murderers Cr Reach 1	SF Murderers Cr Reach 1	Deer Creek Reach 5	-	-	-	-	-
Pasture Name	Timber Mountain	Timber Mountain	Deer Creek	-	-	-	-	-
Survey Date	2003	2008	2008	-	-	-	-	-
Sample Type	I	I	K	-	-	-	-	-
6 <sup>th</sup> Field HUC	170702010402	"	170702010205	-	-	-	-	-
<i>Av Bankfull (B) and/or Wetted (W) Width (feet)</i>	-	-	-	-	-	-	-	-
<i>Av Gradient (%)</i>	-	-	-	-	-	-	-	-



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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	<b>PIBO Effectiveness Monitoring Data</b>			<b>PAC FISH RMO</b>	<b>Amend 29 DFC</b>	<b>NMFS Matrix of Pathways and Indicators Ranges of Criteria</b>		
						<b>Properly Functioning</b>	<b>At Risk</b>	<b>Not Properly Functioning</b>
<b>Residual Pool Depth (feet)</b>	0.19	0.16	0.39	-	-	-	-	-
<b>Pool Frequency (#/mi)</b>	-	-	-	96 <sup>2</sup> 56 <sup>3</sup> 47 <sup>4</sup> 26 <sup>5</sup>	75-132 <sup>2</sup> 38-66 <sup>3</sup> 30-53 <sup>4</sup> 15-26 <sup>5</sup>	Meets pool freq & LWD recruitment standards channel width    # pools/mile 5 feet            184 10 "              96 15 "              70 20 "              56 25 "              47 50 "              26	Meets pool freq standards but not LWD recruitment	Does not meet pool freq standards
<i>Pool Quality</i>	-	-	-	-	-	Pools >1m (3.28ft) deep, good cover, cool water, minimal filling	Few >1m pools or inadequate cover/temp, moderate filling	No >1m pools & inadequate cover/temp, major filling with sediment
<b>Percent Pools</b>	11.4	13.1	62.1	-	-	-	-	-
<b>Bankfull (B) or Wetted (W) W/D Ratio</b>	B 71.2	B 40.3	B 17.6	<10 <sup>6</sup>	<10 <sup>6</sup>	<10 <sup>7</sup>	10-12 <sup>7</sup>	>12 <sup>7</sup>
<b>D50 (mm), or Dominant Substrate &amp; Embeddedness</b>	0.02	0.04	-	-	Embedded <=20%	Dominant substrate gravel (2-64 mm) or cobble (64-256 mm) (interstitial spaces clear), or embeddedness <20%	Gravel or cobble subdominant, or embeddedness 20-30% if dominant	Bedrock, sand, silt, or small gravel dominant, or embeddedness >30% if gravel or cobble dominant
<b>Pct Fines &lt;2 mm in Riffles (R) or Pool Tails (P)</b>	P 20.2	P 16.2	-	-	-	<12% fines <sup>8</sup> in gravel	12-20% fines <sup>8</sup> in gravel	>20% fines <sup>8</sup> in gravel

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	<b>PIBO Effectiveness Monitoring Data</b>			<b>PAC FISH RMO</b>	<b>Amend 29 DFC</b>	<b>NMFS Matrix of Pathways and Indicators Ranges of Criteria</b>		
						<b>Properly Functioning</b>	<b>At Risk</b>	<b>Not Properly Functioning</b>
<b>Percent Stable Banks (CS &amp; FB)</b>	45.0	95.2	88.0	>80	>90	>90% stable	80-90% stable	< 80% stable
<b>Percent Stable Banks (CS, FB, US)</b>	-	-	-	-	-	-	-	-
<b>Percent Undercut Banks</b>	2.9	2.4	21.4	>75	50-75% undercut <sup>9</sup>	-	-	-
<b>Large Wood Frequency (#/mi)<sup>14</sup></b>	-	-	-	>20 <sup>13</sup>	20-70 <sup>10</sup> 80-120 <sup>11</sup> 100-350 <sup>12</sup>	>20 <sup>13</sup> and adequate sources for recruitment	>20 but lacks recruitment to maintain	<20 and lacks recruitment
<b>Percent Shade/Canopy Closure</b>	-	-	-	-	40-55 <sup>15</sup> 50-65 <sup>16</sup> 60-75 <sup>17</sup> 80 <sup>18</sup>	-	-	-
<b>Greenline Wetland Rating</b>	24.3	30.7	58.9	-	-	-	-	-
<b>Greenline Woody Cover</b>	22.6	17.4	17.8	-	-	-	-	-
<b>Physical Man-made Barriers<sup>19</sup></b>	-	-	-	-	-	Any in watershed allow passage @ all flows	Any don't allow passage @ base flows	Any don't allow passage @ range of flows
<b>Off-channel Habitat &amp; Refugia</b>	-	-	-	-	-	Low energy backwaters & side channels	Some backwaters & high energy side channels	Few or no backwaters

Notes: **1)** All PIBO data units converted from metric to English except for mm measurements; **2)** Channels of <10 feet in width; **3)** Channels of >10 to 20 feet in width; **4)** Channels of >20 to 25 feet in width; **5)** Channels of >25 to 50 feet in width; **6)** Criteria is for wetted W/D ratio; **7)** Criteria is for bankfull W/D ratio; **8)** Fines defined as <0.85mm in gravel; **9)** In non-forested systems with 2% or less gradient; **10)** In Ponderosa

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pine ecosystems (at least 12 inches in diameter and 20% > 20 inches in diameter; and at least 35 feet long or 1.5 times bankfull width); **11)** In mixed conifer ecosystems (at least 12 inches in diameter and 20% > 20 inches in diameter; and at least 35 feet long or 1.5 times bankfull width); **12)** In Lodgepole pine ecosystems (at least 6 inches in diameter and 10% > 12 inches in diameter; and at least 18 feet long or 1.5 times bankfull width); **13)** LWD defined as >12 inch diameter and > 35 ft length; **14)** Stream surveys conducted in 1995 and earlier **a)** included not only LW material within the bankfull channel, but also leaning trees that have the potential to fall into the stream, and **b)** included a “Brush” LWD category that is not considered functional LWD as per Amendment 29 DFCs and the MPI unless in Lodgepole Pine ecosystems. Stream surveys conducted in 1996 and later **a)** only included trees actually within the bankfull channel interacting with stream flow during bankfull conditions, and **b)** included a “Small” LWD category that is not considered functional LWD as described above; **15)** In Ponderosa pine ecosystems; **16)** In mixed conifer ecosystems; **17)** In Lodgepole pine ecosystems; **18)** In hardwood/meadow complexes; **19)** Culvert barrier data from MNF Culvert Assessment GIS layer.

**Table 12. Summary of Available R6 Stream Survey Data vs. Fish Habitat Standards for Streams within Allotments.**

### South Fork Murderers Creek

PIBO Data <sup>1</sup> ( <b>Bold</b> ) <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data				PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
							Properly Functioning	At Risk	Not Properly Functioning
Stream Name	<b>SF Murderers Creek Reach 1</b>	<b>SF Murderers Creek Reaches 1-2</b>	<b>SF Murderers Creek Reaches 2-3</b>	<b>SF Murderers Creek Reaches 3-4</b>	-	-	-	-	-
Pasture Name	Timber Mountain (exclosure constructed 2010)	Timber Mountain (exclosure constructe d 2010)	Blue Ridge, SF M.C. Gather	Blue Ridge	-	-	-	-	-
Survey Date	1992 (June 23-July 2)	2009 (July 8-10)	1992 (June 23-July 2)	2009 (July 8-10)	-	-	-	-	-
<b>Sample Type</b>	-	-	-	-	-	-	-	-	-
6 <sup>th</sup> Field HUC	1707020104 02	6635	6635	6635	-	-	-	-	-

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data				PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
							Properly Functioning	At Risk	Not Properly Functioning
<b><i>Av Bankfull (B) and/or Wetted (W) Width (feet)</i></b>	W 7.9	W 12.1 B 22.7	W 7.1	W 8.8 B 13.9	-	-	-	-	-
<b><i>Av Gradient (%)</i></b>	2.0	3.5	3.5	5.5	-	-	-	-	-
<b><i>Residual Pool Depth (feet)</i></b>	0.7	1.1	1.0	1.1	-	-	-	-	-
<b><i>Pool Frequency (#/mi)</i></b>	32.4	36.3	59.1	81.6	96 <sup>2</sup> 56 <sup>3</sup> 47 <sup>4</sup> 26 <sup>5</sup>	75-132 <sup>2</sup> 38-66 <sup>3</sup> 30-53 <sup>4</sup> 15-26 <sup>5</sup>	Meets pool freq & LWD recruitment standards channel width    # pools/mile 5 feet            184 10 "              96 15 "              70 20 "              56 25 "              47 50 "              26	Meets pool freq standards but not LWD recruitment	Does not meet pool freq standards
<b><i>Pool Quality</i></b>	No >1m deep pools, Max spot temp 52.0F	No >1m deep pools, Max spot temp 60.8 F	No >1m deep pools, Max spot temp 57.0F	No >1m deep pools, Max spot temp 53.6F	-	-	Pools >1m (3.28ft) deep, good cover, cool water, minimal filling	Few >1m pools or inadequate cover/temp, moderate filling	No >1m pools & inadequate cover/temp, major filling with sediment
<b><i>Percent Pools</i></b>	25.7	33.56	46.9	60.7	-	-	-	-	-
<b><i>Bankfull (B) or Wetted (W) W/D Ratio</i></b>	B 5.0	B 15.6	B 8.8	B 10.3	<10 <sup>6</sup>	<10 <sup>6</sup>	<10 <sup>7</sup>	10-12 <sup>7</sup>	>12 <sup>7</sup>
<b><i>D50 (mm), or Dominant Substrate &amp; Embeddedness</i></b>	Cobble, Embeddedness >35%	Gravel	Cobble, Embeddedness >35%	Cobble	-	Embedded <=20%	Dominant substrate gravel (2-64 mm) or cobble (64-256 mm) (interstitial spaces)	Gravel or cobble subdominant, or embeddedness 20-30% if	Bedrock, sand, silt, or small gravel dominant, or embeddedness

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data				PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
							Properly Functioning	At Risk	Not Properly Functioning
							clear), or embeddedness <20%	dominant	>30% if gravel or cobble dominant
<b><i>Pct Fines &lt;2 mm in Riffles (R) or Pool Tails (P)</i></b>	-	-	-	-	-	-	<12% fines <sup>8</sup> in gravel	12-20% fines <sup>8</sup> in gravel	>20% fines <sup>8</sup> in gravel
<b><i>Percent Stable Banks (CS &amp; FB)</i></b>	91.0	94.0	92.8	99.0	>80	>90	>90% stable	80-90% stable	< 80% stable
<b>Percent Stable Banks (CS, FB, US)</b>	-	-	-	-	-	-	-	-	-
<b>Percent Undercut Banks</b>	-	-	-	-	>75	50-75% undercut <sup>9</sup>	-	-	-
<b><i>Large Wood Frequency (#/mi)<sup>14</sup></i></b>	7.2 <sup>10</sup> , Good recruitment	0.0	51.3 <sup>10</sup> , Good recruitment	5.0	>20 <sup>13</sup>	20-70 <sup>10</sup> 80-120 <sup>11</sup> 100-350 <sup>12</sup>	>20 <sup>13</sup> and adequate sources for recruitment	>20 but lacks recruitment to maintain	<20 and lacks recruitment
<b><i>Percent Shade/Canopy Closure</i></b>	63.2	-	68.05	-	-	40-55 <sup>15</sup> 50-65 <sup>16</sup> 60-75 <sup>17</sup> 80 <sup>18</sup>	-	-	-
<b>Greenline Wetland Rating</b>	-	-	-	-	-	-	-	-	-
<b>Greenline Woody Cover</b>	-	-	-	-	-	-	-	-	-
<b><i>Physical Man-made Barriers<sup>19</sup></i></b>	None	None	None	None	-	-	Any in watershed allow passage @ all flows	Any don't allow passage @ base flows	Any don't allow passage @ range of flows

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol (Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data				PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
							Properly Functioning	At Risk	Not Properly Functioning
<i>Off-channel Habitat &amp; Refugia</i>	Side channels on 9.6% of reach	Side channels on 5.0% of reaches	Side channels on 1.5% of reaches	Side channels on 1.8% of reaches	-	-	Low energy backwaters & side channels	Some backwaters & high energy side channels	Few or no backwaters
<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol (Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data				PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
							Properly Functioning	At Risk	Not Properly Functioning
Stream Name	<b>SF Murderers Creek Reach 4</b>	<b>SF Murderers Creek Reach 5</b>	<b>SF Murderers Creek Reaches 5</b>	<b>SF Murderers Creek Reach 6-7</b>	-	-	-	-	-
Pasture Name	Horse Mountain	South Fork M.C. Gather	Horse Mountain	Horse Mountain,	-	-	-	-	-
Survey Date	1992 (Jun 23-Jul 2)	2009 (Jul 8-10)	1992 (Jun 23-Jul 2)	2009 (Jul 8-10)	-	-	-	-	-
<b>Sample Type</b>	-	-	-	-	-	-	-	-	-
6 <sup>th</sup> Field HUC	707020104 025	170702010 402	170702010 402	170702010 402	-	-	-	-	-
<b><i>Av Bankfull (B) and/or Wetted (W) Width (feet)</i></b>	W 4.3	W 8.6 B 11.8	W 4.9	W 8.9 B 13.3	-	-	-	-	-
<b><i>Av Gradient (%)</i></b>	2	2	1.5	1	-	-	-	-	-
<b>Residual Pool</b>	1.7	1.8	1.6	1.7	-	-	-	-	-

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data				PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
							Properly Functioning	At Risk	Not Properly Functioning
<b>Depth (feet)</b>									
<b><i>Pool Frequency</i></b> <b><i>(#/mi)</i></b>	46.4	39.0	46.8	8.3	96 <sup>2</sup> 56 <sup>3</sup> 47 <sup>4</sup> 26 <sup>5</sup>	75-132 <sup>2</sup> 38-66 <sup>3</sup> 30-53 <sup>4</sup> 15-26 <sup>5</sup>	Meets pool freq & LWD recruitment standards channel width    # pools/mile 5 feet            184 10 "               96 15 "               70 20 "               56 25 "               47 50 "               26	Meets pool freq standards but not LWD recruitment	Does not meet pool freq standards
<b><i>Pool Quality</i></b>	No >1m deep pools, max spot temp 70.0F	10 >1m deep pools, max spot temp 53.6F	No >1m deep pools, max spot temp 55F	2 >1m deep pools, 53.6F	-	-	Pools >1m (3.28ft) deep, good cover, cool water, minimal filling	Few >1m pools or inadequate cover/temp, moderate filling	No >1m pools & inadequate cover/temp, major filling with sediment
<b><i>Percent Pools</i></b>	84.0	34.1	46.9	18	-	-	-	-	-
<b><i>Bankfull (B) or</i></b> <b><i>Wetted (W) W/D</i></b> <b><i>Ratio</i></b>	B 11.0	B 10.5	B 20.3	B 11.2	<10 <sup>6</sup>	<10 <sup>6</sup>	<10 <sup>7</sup>	10-12 <sup>7</sup>	>12 <sup>7</sup>
<b><i>D50 (mm), or</i></b> <b><i>Dominant Substrate</i></b> <b><i>&amp; Embeddedness</i></b>	Sand, Embedded ness >35%	Gravel	Sand, Embedded ness not >35%	Sand	-	Embedded <=20%	Dominant substrate gravel (2-64 mm) or cobble (64-256 mm) (interstitial spaces clear), or embeddedness <20%	Gravel or cobble subdominant, or embeddedness 20-30% if dominant	Bedrock, sand, silt, or small gravel dominant, or embeddedness >30% if gravel or cobble dominant
<b><i>Pct Fines &lt;2 mm in</i></b> <b><i>Riffles (R) or Pool</i></b> <b><i>Tails (P)</i></b>	-	-	-	-	-	-	<12% fines <sup>8</sup> in gravel	12-20% fines <sup>8</sup> in gravel	>20% fines <sup>8</sup> in gravel

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data				PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
							Properly Functioning	At Risk	Not Properly Functioning
<b>Percent Stable Banks (CS &amp; FB)</b>	88.0	92.0	86.8	94.0	>80	>90	>90% stable	80-90% stable	< 80% stable
<b>Percent Stable Banks (CS, FB, US)</b>	-	-	-	-	-	-	-	-	-
<b>Percent Undercut Banks</b>	-	-	-	-	>75	50-75% undercut <sup>9</sup>	-	-	-
<b>Large Wood Frequency (#/mi)<sup>14</sup></b>	30.4 <sup>10</sup> , Good Recruitment	5.0 <sup>10</sup>	8.5 <sup>10</sup> , Poor Recruitment	8.0 <sup>10</sup>	>20 <sup>13</sup>	20-70 <sup>10</sup> 80-120 <sup>11</sup> 100-350 <sup>12</sup>	>20 <sup>13</sup> and adequate sources for recruitment	>20 but lacks recruitment to maintain	<20 and lacks recruitment
<b>Percent Shade/Canopy Closure</b>	41.0	-	23.9	-	-	40-55 <sup>15</sup> 50-65 <sup>16</sup> 60-75 <sup>17</sup> 80 <sup>18</sup>	-	-	-
<b>Greenline Wetland Rating</b>	-	-	-	-	-	-	-	-	-
<b>Greenline Woody Cover</b>	-	-	-	-	-	-	-	-	-
<b>Physical Man-made Barriers<sup>19</sup></b>	None	None	None	1 Culvert barrier	-	-	Any in watershed allow passage @ all flows	Any don't allow passage @ base flows	Any don't allow passage @ range of flows
<b>Off-channel Habitat &amp; Refugia</b>	Side channels on 1.5% of reach	No side channels on reach	Side channels on 5.8% of reach	No side channels on reaches	-	-	Low energy backwaters & side channels	Some backwaters & high energy side channels	Few or no backwaters
<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i>	R6 Level II Stream Survey Data				PAC FISH	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		



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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data				PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
							Properly Functioning	At Risk	Not Properly Functioning
<i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>					RMO		Properly Functioning	At Risk	Not Properly Functioning
Stream Name	SF Murderers Creek Reach 7	SF Murderers Creek Reach 8	SF Murderers Creek Reaches 8	SF Murderers Creek Reach 9	-	-	-	-	-
Pasture Name	John Young Cow Camp	John Young Cow Camp	John Young Meadow	John Young Meadow	-	-	-	-	-
Survey Date	1992 (Jun 23-Jul 2)	2009( Jul 8- 10)	1992 (Jun 23-Jul 2)	2009 (Jul 8-10)	-	-	-	-	-
Sample Type	-	-	-	-	-	-	-	-	-
6 <sup>th</sup> Field HUC	170702010 402	6633	6633	6633	-	-	-	-	-
<b>Av Bankfull (B)</b> <b>and/or Wetted (W)</b> <b>Width (feet)</b>	W 2.7	W 12.4 B 6	W 6.0	W 3.8 B 7.5	-	-	-	-	-
<b>Av Gradient (%)</b>	1	1	2	1	-	-	-	-	-
<b>Residual Pool Depth (feet)</b>	0.6	1.5	1.4	1.5	-	-	-	-	-
<b>Pool Frequency (#/mi)</b>	95.6	1.7	25.4	1.2	96 <sup>2</sup> 56 <sup>3</sup> 47 <sup>4</sup> 26 <sup>5</sup>	75-132 <sup>2</sup> 38-66 <sup>3</sup> 30-53 <sup>4</sup> 15-26 <sup>5</sup>	Meets pool freq & LWD recruitment standards channel width    # pools/mile 5 feet            184 10 "              96 15 "              70	Meets pool freq standards but not LWD recruitment	Does not meet pool freq standards

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol (Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data				PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
							Properly Functioning	At Risk	Not Properly Functioning
							20 " 56 25 " 47 50 " 26		
<i>Pool Quality</i>	No >1m deep pools, max spot temp 61.0F	No >1m deep pools, max spot temp 57.2F	No >1m deep pools, max spot temp 57.0F	No >1m deep pools, max spot temp 64.4F	-	-	Pools >1m (3.28ft) deep, good cover, cool water, minimal filling	Few >1m pools or inadequate cover/temp, moderate filling	No >1m pools & inadequate cover/temp, major filling with sediment
<b>Percent Pools</b>	63.1	0.4	97.0	0.6	-	-	-	-	-
<b>Bankfull (B) or Wetted (W) W/D Ratio</b>	B 3.9	B 7.5	-	B 6.3	<10 <sup>6</sup>	<10 <sup>6</sup>	<10 <sup>7</sup>	10-12 <sup>7</sup>	>12 <sup>7</sup>
<b>D50 (mm), or Dominant Substrate &amp; Embeddedness</b>	Sand, Embeddedness >35%	Sand	Sand, Embeddedness >35%	Sand	-	Embedded <=20%	Dominant substrate gravel (2-64 mm) or cobble (64-256 mm) (interstitial spaces clear), or embeddedness <20%	Gravel or cobble subdominant, or embeddedness 20-30% if dominant	Bedrock, sand, silt, or small gravel dominant, or embeddedness >30% if gravel or cobble dominant
<b>Pct Fines &lt;2 mm in Riffles (R) or Pool Tails (P)</b>	-	-	-	-	-	-	<12% fines <sup>8</sup> in gravel	12-20% fines <sup>8</sup> in gravel	>20% fines <sup>8</sup> in gravel
<b>Percent Stable Banks (CS &amp; FB)</b>	96.8	100	99.8	93.6	>80	>90	>90% stable	80-90% stable	< 80% stable
<b>Percent Stable Banks (CS, FB, US)</b>	-	-	-	-	-	-	-	-	-
<b>Percent Undercut</b>	-	-	-	-	>75	50-75%	-	-	-

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data				PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
							Properly Functioning	At Risk	Not Properly Functioning
<b>Banks</b>						undercut <sup>9</sup>			
<b><i>Large Wood Frequency (#/mi)<sup>14</sup></i></b>	0.0 <sup>10</sup> , Poor Recruitment	2.0 <sup>10</sup>	4.5 <sup>10</sup> , Poor Recruitment	0.0 <sup>10</sup>	>20 <sup>13</sup>	20-70 <sup>10</sup> 80-120 <sup>11</sup> 100-350 <sup>12</sup>	>20 <sup>13</sup> and adequate sources for recruitment	>20 but lacks recruitment to maintain	<20 and lacks recruitment
<i>Percent Shade/Canopy Closure</i>	32.7	-	22.7	-	-	40-55 <sup>15</sup> 50-65 <sup>16</sup> 60-75 <sup>17</sup> 80 <sup>18</sup>	-	-	-
<b>Greenline Wetland Rating</b>	-	-	-	-	-	-	-	-	-
<b>Greenline Woody Cover</b>	-	-	-	-	-	-	-	-	-
<i>Physical Man-made Barriers<sup>19</sup></i>	None	None	1 culvert barrier	1 culvert barrier	-	-	Any in watershed allow passage @ all flows	Any don't allow passage @ base flows	Any don't allow passage @ range of flows
<i>Off-channel Habitat &amp; Refugia</i>	Side channels on 25.5% of reach (beaver complex)	No side channel habitat	Side channels on 2.1% of reach	No side channel habitat	-	-	Low energy backwaters & side channels	Some backwaters & high energy side channels	Few or no backwaters

Notes: **1)** All PIBO data units converted from metric to English except for mm measurements; **2)** Channels of <10 feet in width; **3)** Channels of >10 to 20 feet in width; **4)** Channels of >20 to 25 feet in width; **5)** Channels of >25 to 50 feet in width; **6)** Criteria is for wetted W/D ratio; **7)** Criteria is for bankfull W/D ratio; **8)** Fines defined as <0.85mm in gravel; **9)** In non-forested systems with 2% or less gradient; **10)** In Ponderosa pine ecosystems (at least 12 inches in diameter and 20% > 20 inches in diameter; and at least 35 feet long or 1.5 times bankfull width); **11)** In mixed conifer ecosystems (at least 12 inches in diameter and 20% > 20 inches in diameter; and at least 35 feet long or 1.5 times bankfull width); **12)** In Lodgepole pine ecosystems (at least 6 inches in diameter and 10% > 12 inches in diameter; and at least 18 feet long or 1.5 times bankfull width); **13)** LWD defined as >12 inch diameter and > 35 ft length; **14)** Stream surveys conducted in 1995 and earlier **a)** included not only LW

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material within the bankfull channel, but also leaning trees that have the potential to fall into the stream, and **b)** included a “Brush” LWD category that is not considered functional LWD as per Amendment 29 DFCs and the MPI unless in Lodgepole Pine ecosystems. Stream surveys conducted in 1996 and later **a)** only included trees actually within the bankfull channel interacting with stream flow during bankfull conditions, and **b)** included a “Small” LWD category that is not considered functional LWD as described above; **15)** In Ponderosa pine ecosystems; **16)** In mixed conifer ecosystems; **17)** In Lodgepole pine ecosystems; **18)** In hardwood/meadow complexes; **19)** Culvert barrier data from MNF Culvert Assessment GIS layer.

**Table 13. Summary of Available R6 Stream Survey Data vs. Fish Habitat Standards for Streams within Allotments. Tex, Dans, and Orange Creeks**

PIBO Data <sup>1</sup> (Bold) <i>R6 Survey Protocol (Italics)</i> <i>Both (Bold &amp; Italics)</i>	R6 Level II Stream Survey Data			PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
						Properly Functioning	At Risk	Not Properly Functioning
Stream Name	<b>Tex Creek Reach 1</b>	<b>Dans Creek Reach 1</b>	<b>Orange Creek Reach 1</b>	-	-	-	-	-
Pasture Name	Tex Creek Gather	Dans Creek	Dans Creek	-	-	-	-	-
Survey Date	1995 (Aug 16-29)	1992 (June 25)	1992 (June 26)	-	-	-	-	-
Sample Type	-	-	-	-	-	-	-	-
6 <sup>th</sup> Field HUC	170702010301	170702010401	170702010401	-	-	-	-	-
<b><i>Av Bankfull (B) and/or Wetted (W) Width (feet)</i></b>	B 15.4 W 7.8	W 4.5	W 2.5	-	-	-	-	-
<b><i>Av Gradient (%)</i></b>	2.0	4.0	7.0	-	-	-	-	-
<b><i>Residual Pool Depth (feet)</i></b>	1.1	0.7	0.5	-	-	-	-	-
<b><i>Pool Frequency</i></b>	35.5	63.5	38.2	96 <sup>2</sup> 56 <sup>3</sup>	75-132 <sup>2</sup> 38-66 <sup>3</sup>	Meets pool freq & LWD recruitment standards	Meets pool freq standards but	Does not meet pool freq standards

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data			PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
						Properly Functioning	At Risk	Not Properly Functioning
<b>(#/mi)</b>				47 <sup>4</sup> 26 <sup>5</sup>	30-53 <sup>4</sup> 15-26 <sup>5</sup>	channel width    # pools/mile 5 feet            184 10 "               96 15 "               70 20 "               56 25 "               47 50 "               26	not LWD recruitment	
<i>Pool Quality</i>	Max spot temp 60.0F	No >1m deep pools, max spot temp 50.0F	No >1m deep pools, Max spot temp 52.0F	-	-	Pools >1m (3.28ft) deep, good cover, cool water, minimal filling	Few >1m pools or inadequate cover/temp, moderate filling	No >1m pools & inadequate cover/temp, major filling with sediment
<b>Percent Pools</b>	60.4	43.0	89.2	-	-	-	-	-
<b>Bankfull (B) or Wetted (W) W/D Ratio</b>	B 26.5	B 8.1	B 8.2	<10 <sup>6</sup>	<10 <sup>6</sup>	<10 <sup>7</sup>	10-12 <sup>7</sup>	>12 <sup>7</sup>
<b>D50 (mm), or Dominant Substrate &amp; Embeddedness</b>	Gravel, Embeddedness >20%	Sand, Embeddedness >35%	Sand, Embeddedness >35%	-	Embedded <=20%	Dominant substrate gravel (2-64 mm) or cobble (64-256 mm) (interstitial spaces clear), or embeddedness <20%	Gravel or cobble subdominant, or embeddedness 20-30% if dominant	Bedrock, sand, silt, or small gravel dominant, or embeddedness >30% if gravel or cobble dominant
<b>Pct Fines &lt;2 mm in Riffles (R) or Pool Tails (P)</b>	-	-	-	-	-	<12% fines <sup>8</sup> in gravel	12-20% fines <sup>8</sup> in gravel	>20% fines <sup>8</sup> in gravel
<b>Percent Stable</b>	80-90	-	77.0	>80	>90	>90% stable	80-90% stable	< 80% stable

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data			PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
						Properly Functioning	At Risk	Not Properly Functioning
<b><i>Banks (CS &amp; FB)</i></b>								
<b>Percent Stable Banks (CS, FB, US)</b>	-	-	-	-	-	-	-	-
<b>Percent Undercut Banks</b>	-	-	-	>75	50-75% undercut <sup>9</sup>	-	-	-
<b><i>Large Wood Frequency (#/mi)<sup>14</sup></i></b>	4.0 <sup>10</sup>	89.2 <sup>10</sup> , Poor Recruitment	37.6 <sup>11</sup> , Poor Recruitment	>20 <sup>13</sup>	20-70 <sup>10</sup> 80-120 <sup>11</sup> 100-350 <sup>12</sup>	>20 <sup>13</sup> and adequate sources for recruitment	>20 but lacks recruitment to maintain	<20 and lacks recruitment
<b><i>Percent Shade/Canopy Closure</i></b>	23.0	61.5	77.0	-	40-55 <sup>15</sup> 50-65 <sup>16</sup> 60-75 <sup>17</sup> 80 <sup>18</sup>	-	-	-
<b>Greenline Wetland Rating</b>	-	-	-	-	-	-	-	-
<b>Greenline Woody Cover</b>	-	-	-	-	-	-	-	-
<b><i>Physical Man-made Barriers<sup>19</sup></i></b>	One Barrier Culvert	2 barrier culverts	None	-	-	Any in watershed allow passage @ all flows	Any don't allow passage @ base flows	Any don't allow passage @ range of flows
<b><i>Off-channel Habitat &amp; Refugia</i></b>	-	Side channels on 0.3% of reaches	Side channels on 0.2% of reaches	-	-	Low energy backwaters & side channels	Some backwaters & high energy side channels	Few or no backwaters

Notes: **1)** All PIBO data units converted from metric to English except for mm measurements; **2)** Channels of <10 feet in width; **3)** Channels of >10 to 20 feet in width; **4)** Channels of >20 to 25 feet in width; **5)** Channels of >25 to 50 feet in width; **6)** Criteria is for wetted W/D ratio; **7)** Criteria is for bankfull W/D ratio; **8)** Fines defined as <0.85mm in gravel; **9)** In non-forested systems with 2% or less gradient; **10)** In Ponderosa

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pine ecosystems (at least 12 inches in diameter and 20% > 20 inches in diameter; and at least 35 feet long or 1.5 times bankfull width); **11)** In mixed conifer ecosystems (at least 12 inches in diameter and 20% > 20 inches in diameter; and at least 35 feet long or 1.5 times bankfull width); **12)** In Lodgepole pine ecosystems (at least 6 inches in diameter and 10% > 12 inches in diameter; and at least 18 feet long or 1.5 times bankfull width); **13)** LWD defined as >12 inch diameter and > 35 ft length; **14)** Stream surveys conducted in 1995 and earlier **a)** included not only LW material within the bankfull channel, but also leaning trees that have the potential to fall into the stream, and **b)** included a “Brush” LWD category that is not considered functional LWD as per Amendment 29 DFCs and the MPI unless in Lodgepole Pine ecosystems. Stream surveys conducted in 1996 and later **a)** only included trees actually within the bankfull channel interacting with stream flow during bankfull conditions, and **b)** included a “Small” LWD category that is not considered functional LWD as described above; **15)** In Ponderosa pine ecosystems; **16)** In mixed conifer ecosystems; **17)** In Lodgepole pine ecosystems; **18)** In hardwood/meadow complexes; **19)** Culvert barrier data from MNF Culvert Assessment GIS layer.

**Table 14. Summary of PIBO Effectiveness Monitoring Data vs. Fish Habitat Standards for Streams within Allotments.  
Thorn Creek**

PIBO Data <sup>1</sup> ( <b>Bold</b> ) <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	PIBO Effectiveness Monitoring Data				PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
							Properly Functioning	At Risk	Not Properly Functioning
Stream Name	Thorn Cr Reach 1	Thorn Cr Reach 1	Thorn Cr Reach 1	Thorn Cr Reach 1	-	-	-	-	-
Pasture Name	Martin Corrals	Martin Corrals	Martin Corrals	Martin Corrals	-	-	-	-	-
Survey Date	2003	2008	2003	2008	-	-	-	-	-
Sample Type	I	I	K	K	-	-	-	-	-
6 <sup>th</sup> Field HUC	170702010403	6635	6635	6635	-	-	-	-	-
<b><i>Av Bankfull (B) and/or Wetted (W) Width (feet)</i></b>	-	-	-	-	-	-	-	-	-
<b><i>Av Gradient (%)</i></b>	-	-	-	-	-	-	-	-	-
Residual Pool	0.19	0.16	-	0.19	-	-	-	-	-

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	<b>PIBO Effectiveness Monitoring Data</b>				<b>PAC FISH RMO</b>	<b>Amend 29 DFC</b>	<b>NMFS Matrix of Pathways and Indicators Ranges of Criteria</b>		
							<b>Properly Functioning</b>	<b>At Risk</b>	<b>Not Properly Functioning</b>
<b>Depth (feet)</b>									
<b>Pool Frequency (#/mi)</b>	-	-	-	-	96 <sup>2</sup> 56 <sup>3</sup> 47 <sup>4</sup> 26 <sup>5</sup>	75-132 <sup>2</sup> 38-66 <sup>3</sup> 30-53 <sup>4</sup> 15-26 <sup>5</sup>	Meets pool freq & LWD recruitment standards channel width   # pools/mile 5 feet            184 10 "              96 15 "              70 20 "              56 25 "              47 50 "              26	Meets pool freq standards but not LWD recruitment	Does not meet pool freq standards
<i>Pool Quality</i>	-	-	-	-	-	-	Pools >1m (3.28ft) deep, good cover, cool water, minimal filling	Few >1m pools or inadequate cover/temp, moderate filling	No >1m pools & inadequate cover/temp, major filling with sediment
<b>Percent Pools</b>	66.5	28.0	-	29.1	-	-	-	-	-
<b>Bankfull (B) or Wetted (W) W/D Ratio</b>	B 19.7	B 20.6	-	B 20.8	<10 <sup>6</sup>	<10 <sup>6</sup>	<10 <sup>7</sup>	10-12 <sup>7</sup>	>12 <sup>7</sup>
<b>D50 (mm), or Dominant Substrate &amp; Embeddedness</b>	0.01	0.01	-	-	-	Embedded <=20%	Dominant substrate gravel (2-64 mm) or cobble (64-256 mm) (interstitial spaces clear), or embeddedness <20%	Gravel or cobble subdominant, or embeddedness 20-30% if dominant	Bedrock, sand, silt, or small gravel dominant, or embeddedness >30% if gravel or cobble dominant
<b>Pct Fines &lt;2 mm in Riffles (R) or Pool Tails (P)</b>	P 49.7	P 71.4	-	-	-	-	<12% fines <sup>8</sup> in gravel	12-20% fines <sup>8</sup> in gravel	>20% fines <sup>8</sup> in gravel



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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	<b>PIBO Effectiveness Monitoring Data</b>				<b>PAC FISH RMO</b>	<b>Amend 29 DFC</b>	<b>NMFS Matrix of Pathways and Indicators Ranges of Criteria</b>		
							<b>Properly Functioning</b>	<b>At Risk</b>	<b>Not Properly Functioning</b>
<b>Percent Stable Banks (CS &amp; FB)</b>	59.1	58.7	59.5	92.9	>80	>90	>90% stable	80-90% stable	< 80% stable
<b>Percent Stable Banks (CS, FB, US)</b>	-	-	-	-	-	-	-	-	-
<b>Percent Undercut Banks</b>	13.6	17.4	7.3	4.9	>75	50-75% undercut <sup>9</sup>	-	-	-
<b>Large Wood Frequency (#/mi)<sup>14</sup></b>	-	-	-	-	>20 <sup>13</sup>	20-70 <sup>10</sup> 80-120 <sup>11</sup> 100-350 <sup>12</sup>	>20 <sup>13</sup> and adequate sources for recruitment	>20 but lacks recruitment to maintain	<20 and lacks recruitment
<b>Percent Shade/Canopy Closure</b>	-	-	-	-	-	40-55 <sup>15</sup> 50-65 <sup>16</sup> 60-75 <sup>17</sup> 80 <sup>18</sup>	-	-	-
<b>Greenline Wetland Rating</b>	54.0	60.1	56.1	50.0	-	-	-	-	-
<b>Greenline Woody Cover</b>	57.9	62.5	82.4	72.6	-	-	-	-	-
<b>Physical Man-made Barriers<sup>19</sup></b>	-	-	-	-	-	-	Any in watershed allow passage @ all flows	Any don't allow passage @ base flows	Any don't allow passage @ range of flows
<b>Off-channel Habitat &amp; Refugia</b>	-	-	-	-	-	-	Low energy backwaters & side channels	Some backwaters & high energy side channels	Few or no backwaters

Notes: **1)** All PIBO data units converted from metric to English except for mm measurements; **2)** Channels of <10 feet in width; **3)** Channels of >10 to 20 feet in width; **4)** Channels of >20 to 25 feet in width; **5)** Channels of >25 to 50 feet in width; **6)** Criteria is for wetted W/D ratio; **7)** Criteria is for bankfull W/D ratio; **8)** Fines defined as <0.85mm in gravel; **9)** In non-forested systems with 2% or less gradient; **10)** In Ponderosa

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pine ecosystems (at least 12 inches in diameter and 20% > 20 inches in diameter; and at least 35 feet long or 1.5 times bankfull width); **11)** In mixed conifer ecosystems (at least 12 inches in diameter and 20% > 20 inches in diameter; and at least 35 feet long or 1.5 times bankfull width); **12)** In Lodgepole pine ecosystems (at least 6 inches in diameter and 10% > 12 inches in diameter; and at least 18 feet long or 1.5 times bankfull width); **13)** LWD defined as >12 inch diameter and > 35 ft length; **14)** Stream surveys conducted in 1995 and earlier **a)** included not only LW material within the bankfull channel, but also leaning trees that have the potential to fall into the stream, and **b)** included a “Brush” LWD category that is not considered functional LWD as per Amendment 29 DFCs and the MPI unless in Lodgepole Pine ecosystems. Stream surveys conducted in 1996 and later **a)** only included trees actually within the bankfull channel interacting with stream flow during bankfull conditions, and **b)** included a “Small” LWD category that is not considered functional LWD as described above; **15)** In Ponderosa pine ecosystems; **16)** In mixed conifer ecosystems; **17)** In Lodgepole pine ecosystems; **18)** In hardwood/meadow complexes; **19)** Culvert barrier data from MNF Culvert Assessment GIS layer.

**Table 15. Summary of Available R6 Stream Survey Data vs. Fish Habitat Standards for Streams within Allotments.  
Thorn Creek**

PIBO Data <sup>1</sup> ( <b>Bold</b> ) <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data		PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
					Properly Functioning	At Risk	Not Properly Functioning
Stream Name	Thorn Creek Reaches 1- 2	Thorn Creek Reach 3	-	-	-	-	-
Pasture Name	Martin Corrals	Oregon Mine	-	-	-	-	-
Survey Date	1992 (July 3-7)	1992 (July 3-7)	-	-	-	-	-
Sample Type	-	-	-	-	-	-	-
6 <sup>th</sup> Field HUC	170702010403	170702010403	-	-	-	-	-
<b><i>Av Bankfull (B) and/or Wetted (W) Width (feet)</i></b>	W 4.0	W 3.3	-	-	-	-	-
<b><i>Av Gradient (%)</i></b>	3.5	3.0	-	-	-	-	-
<b><i>Av Residual Pool</i></b>	0.5	0.6	-	-	-	-	-

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data		PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
					Properly Functioning	At Risk	Not Properly Functioning
<b>Depth (feet)</b>							
<b><i>Pool Frequency</i></b> <b><i>(#/mi)</i></b>	82.8	54.3	96 <sup>2</sup> 56 <sup>3</sup> 47 <sup>4</sup> 26 <sup>5</sup>	75-132 <sup>2</sup> 38-66 <sup>3</sup> 30-53 <sup>4</sup> 15-26 <sup>5</sup>	Meets pool freq & LWD recruitment standards channel width    # pools/mile 5 feet            184 10 "               96 15 "               70 20 "               56 25 "               47 50 "               26	Meets pool freq standards but not LWD recruitment	Does not meet pool freq standards
<b><i>Pool Quality</i></b>	No >1m deep pools, Max spot temp 50.0F	No >1m deep pools, Max spot temp 54.0F	-	-	Pools >1m (3.28ft) deep, good cover, cool water, minimal filling	Few >1m pools or inadequate cover/temp, moderate filling	No >1m pools & inadequate cover/temp, major filling with sediment
<b><i>Percent Pools</i></b>	29.0	16.5	-	-	-	-	-
<b><i>Bankfull (B) or</i></b> <b><i>Wetted (W) W/D</i></b> <b><i>Ratio</i></b>	B 14.0	B 4.6	<10 <sup>6</sup>	<10 <sup>6</sup>	<10 <sup>7</sup>	10-12 <sup>7</sup>	>12 <sup>7</sup>
<b><i>D50 (mm), or</i></b> <b><i>Dominant Substrate</i></b> <b><i>&amp; Embeddedness</i></b>	Cobble, Embeddedness >35%	Sand, Embeddedness < 35%	-	Embedded <=20%	Dominant substrate gravel (2-64 mm) or cobble (64-256 mm) (interstitial spaces clear), or embeddedness <20%	Gravel or cobble subdominant, or embeddedness 20-30% if dominant	Bedrock, sand, silt, or small gravel dominant, or embeddedness >30% if gravel or cobble dominant
<b><i>Pct Fines &lt;2 mm in</i></b> <b><i>Riffles (R) or Pool</i></b> <b><i>Tails (P)</i></b>	-	-	-	-	<12% fines <sup>8</sup> in gravel	12-20% fines <sup>8</sup> in gravel	>20% fines <sup>8</sup> in gravel

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<b>PIBO Data<sup>1</sup> (Bold)</b> <i>R6 Survey Protocol</i> <i>(Italics)</i> <b>Both (Bold &amp; Italics)</b>	R6 Level II Stream Survey Data		PAC FISH RMO	Amend 29 DFC	NMFS Matrix of Pathways and Indicators Ranges of Criteria		
					Properly Functioning	At Risk	Not Properly Functioning
<b>Percent Stable Banks (CS &amp; FB)</b>	96.3	100	>80	>90	>90% stable	80-90% stable	< 80% stable
<b>Percent Stable Banks (CS, FB, US)</b>	-	-	-	-	-	-	-
<b>Percent Undercut Banks</b>	-	-	>75	50-75% undercut <sup>9</sup>	-	-	-
<b>Large Wood Frequency (#/mi)<sup>14</sup></b>	46.6 <sup>11</sup> , Poor Recruitment	24.8 <sup>11</sup> , Poor Recruitment	>20 <sup>13</sup>	20-70 <sup>10</sup> 80-120 <sup>11</sup> 100-350 <sup>12</sup>	>20 <sup>13</sup> and adequate sources for recruitment	>20 but lacks recruitment to maintain	<20 and lacks recruitment
<b>Percent Shade/Canopy Closure</b>	>60	>60	-	40-55 <sup>15</sup> 50-65 <sup>16</sup> 60-75 <sup>17</sup> 80 <sup>18</sup>	-	-	-
<b>Greenline Wetland Rating</b>	-	-	-	-	-	-	-
<b>Greenline Woody Cover</b>	-	-	-	-	-	-	-
<b>Physical Man-made Barriers<sup>19</sup></b>	1 barrier culvert	7 culvert barriers	-	-	Any in watershed allow passage @ all flows	Any don't allow passage @ base flows	Any don't allow passage @ range of flows
<b>Off-channel Habitat &amp; Refugia</b>	Side channels on 6% of reaches	Side channels on 2.4% of reaches	-	-	Low energy backwaters & side channels	Some backwaters & high energy side channels	Few or no backwaters

Notes: **1)** All PIBO data units converted from metric to English except for mm measurements; **2)** Channels of <10 feet in width; **3)** Channels of >10 to 20 feet in width; **4)** Channels of >20 to 25 feet in width; **5)** Channels of >25 to 50 feet in width; **6)** Criteria is for wetted W/D ratio; **7)** Criteria is for bankfull W/D ratio; **8)** Fines defined as <0.85mm in gravel; **9)** In non-forested systems with 2% or less gradient; **10)** In Ponderosa

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pine ecosystems (at least 12 inches in diameter and 20% > 20 inches in diameter; and at least 35 feet long or 1.5 times bankfull width); **11)** In mixed conifer ecosystems (at least 12 inches in diameter and 20% > 20 inches in diameter; and at least 35 feet long or 1.5 times bankfull width); **12)** In Lodgepole pine ecosystems (at least 6 inches in diameter and 10% > 12 inches in diameter; and at least 18 feet long or 1.5 times bankfull width); **13)** LWD defined as >12 inch diameter and > 35 ft length; **14)** Stream surveys conducted in 1995 and earlier **a)** included not only LW material within the bankfull channel, but also leaning trees that have the potential to fall into the stream, and **b)** included a “Brush” LWD category that is not considered functional LWD as per Amendment 29 DFCs and the MPI unless in Lodgepole Pine ecosystems. Stream surveys conducted in 1996 and later **a)** only included trees actually within the bankfull channel interacting with stream flow during bankfull conditions, and **b)** included a “Small” LWD category that is not considered functional LWD as described above; **15)** In Ponderosa pine ecosystems; **16)** In mixed conifer ecosystems; **17)** In Lodgepole pine ecosystems; **18)** In hardwood/meadow complexes; **19)** Culvert barrier data from MNF Culvert Assessment GIS layer.

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